Middlesex University

Determinants of E-government Services Adoption in Developing Countries (Egypt)

Submitted in partial fulfilment of the requirements of the degree of Doctor of Philosophy

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Abstract

Electronic government (e-government) was established as an effective mechanism for increasing government productivity and efficiency and a key enabler for citizen-centric services. E-government services are yet to be universally accepted as a medium for accessing online public services since its inception more than a decade ago.

Both governments and academic researchers recognise the problem of low-level adoption of e-government services among citizens; a common problem in both developed and developing countries. E-government adoption, unlike most of IT adoption by employees in private-sector organisations, is voluntary and occurs often in turbulent social-political environments. Therefore, the problem needs to be addressed comprehensively from technological, social, political, and cultural perspectives.

E-government adoption research currently lacks a comprehensive conceptual framework for explaining citizen adoption of e-government services. To fill this gap, this study investigates determinants and factors necessary to enhance citizen adoption of e-government services, by extending the Technology Acceptance Model (TAM) using a set of social, political, and design constructs that are derived from different research literatures.

The research adopted a multi-method approach (combining quantitative and qualitative methods) to explore practices and experiences of implementing and adopting e-government systems in Egypt. The results of this research, in terms of a new customised e-government adoption model and recommendations made for e-government will directly benefit the Egyptian government and developing Arab world countries that share similar circumstances in creating a more efficient e-government adoption strategy..

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Praise to Allah the Almighty, Creator and Sustainers of the Universe, and prayers and blessings are sent on His Prophet.

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Glossary

ICT	Information Communication Technology
G2C	Government-to-citizens
G2B	Government-to-business
G2E	Government-to-Employee
G2G	Government-to-government
MCIT	Ministry of Communication and Technology
CRM	Citizen Relationship Management
MSAD	Ministry of State for Administrative Development
TRA	Theory of Reasoned Action
TPB	Theory of Planned Behaviour
UTAUT	Unified Theory of Acceptance and Use of Technology
TAM	Technology Acceptance Model
PEOU	Perceived Ease of Use
PU	Perceived Usefulness
PPV	Perceived Public Value
TI	Trust in Internet
TG	Trust in Government
WD	Website Design
ATU	Attitude
BI	Behavioural Intention
PMO	Program Management Office
NITC	National Information Technology Centre

1. Introduction

This chapter presents an introduction to the research problem undertaken by this study by first providing an overview of the importance of e-government adoption and rationale behind the study. It then presents the research scope, questions, research design, methods, contribution to knowledge and an outline for the whole thesis structure as shown in the following **Figure 1.1**.

Figure 1.1: Chapter outline

1.1. Research Problem and Rationale

Information and Communication Technology (ICT) can be considered as a vital enabler towards the development of any society. With the majority of countries across the globe having embraced new technologies and having connections to the Internet and the

World Wide Web, more and more governments nowadays are looking at engaging these technologies in an effort to improve the way they offer services to citizens.

E-government is the use of information and communication technologies (ICT), especially the Internet and world-wide-web, to improve the efficiency, cost and quality of the government information and services provided to its stakeholders: citizens, businesses, employees and other government agencies (Srivastava and Teo, 2007). However, although the adoption of e-government has the potential to provide better services to citizens at lower costs, it has acceptance problems.

The acceptance and success of e-government is dependent upon citizen willingness to adopt this innovation (Carter and Balanger, 2005). However, many governments around the world still face the problem of low-level of citizen adoption of e-government services (Belanger and Carter, 2008, Lee et al., 2011, Hofmann et al., 2012, Muhammad et al., 2013, Rana et al. 2015).

E-government adoption occurs in a varying social political environment. Consequently, it must be carefully addressed not only from technological perspectives, but also from social, political and cultural perspectives. Without understanding what motivates the public to use e-government services, governments will not be able to take strategic actions to increase the e-government up-take (Gilbert et al., 2004). However, our understanding of citizen adoption of e-government services is currently lacking due to the following reasons:

- Although technology adoption from the user perspective has been extensively studied in contexts such as e-commerce and the Internet (Tung and Rieck, 2005), relatively few studies have focused on citizen adoption of e-government services (Hofmann et al., 2012, Muhammad et al., 2013).

- There is a lack of empirical research that considers not only technological issues of e-government adoption, but also behavioural issues (Hung et al., 2006, Al-Hujran et al., 2015).

Hence, more empirical studies are required in the area of e-government adoption to help governments to improve their understanding of the issues that affect citizen adoption of e-government services.

In addition, a careful review of the e-government adoption research shows that a large portion of the published research was conducted in developed countries. Hence, little is written about the factors influencing e-government adoption in developing countries. This knowledge gap is particularly apparent in the Arab world (Alhurjan and Chatfield, 2008, Al-Hujran et al. 2015, Rana et al. 2015). Therefore, the major objective of this research is to fill this gap in the literature by conducting empirical field research on e-government adoption in the Arab World, especially Egypt.

Furthermore, grounded in the Technology Acceptance Model (TAM) (Davis et al., 1989), as explained henceforth, this study develops a new conceptual model for factors affecting e-government services adoption by integrating the TAM with a set of social, political and design variables derived from the different research literatures: government and internet trust, perceived public value of e-government (which is the value that the public can acquire through the use of e-government services), and website design. This extended TAM model is to examine the impact of these factors upon citizen adoption of e-government services in developing countries with different national cultures and values, by specifically applying the new model to assess Egyptian e-government adoption.

Egypt has been selected for investigation as a representative of a developing country, which has a running e-government program since 2001 and offers many transactional

services (Sayed, 2004). Despite the high number of services offered online, limited numbers of users are using the services (MSAD, 2010, El Baradei1.L et al., 2012, Elkadi, 2013), Therefore, a better understanding of the factors that influence citizen adoption of e-government services is critically important in Egypt. This research can also have important implications for other Arab countries with similar circumstances.

1.2. Scope of the Study

Two streams of e-government adoption research have been found in the literature: supply side and demand-side (Reddick, 2005). The first stream studies e-government adoption from a supply-side perspective (local and national government), which explores factors that affect the adoption and the implementation of e-government services by the government itself (Reddick, 2005). These factors include IT infrastructure, financial resources, skilled personnel, resistance to change, and red tape. The second stream studies e-government adoption from a demand-side perspective, which examines the factors that influence citizens to adopt and use e-government services. These factors include trust in Internet, trust in government, attitude, perceived usefulness, perceived ease of use, website design, and perceived public value.

However, while a large portion of the academic literature focusing on e-government adoption to date has focused on the supply-side of e-government adoption, relatively little is known about why, and under what circumstances, citizens adopt e-government services (Alhujran and Chatfield, 2008; Kumar et al., 2007; Muhammad et al., 2013, Rana et al. 2015). Therefore, the scope of this study is only computer literate citizens and the citizen's (demand-side) adoption of e-government.

1.3. Research Questions

This study aims to address the following main research question and its sub questions:

How can citizen adoption of E-Government services in Egypt be enhanced?

1. What is the current state of e-government services adoption in Egypt?
2. What are the factors that influence the citizens' acceptance and adoption of e-government services in Egypt?
3. What is the relative importance of these factors and the relationship between them?
4. How can the findings of this research assist Egyptian government and other Arab countries government in similar circumstances in planning and implementing e-government adoption?

1.4. Research Objectives

Building upon the research questions, the overall aim of this research is to identify the factors that influence citizens' adoption of e-government services in Egypt, and methods to enhance adoption. The following are the objectives of this research to achieve the main aim and answer the research questions:

1. Define the challenges that face the implementation of e-government in Egypt from government perspective.

2. Define the factors affecting citizen adoption of e-government from user and managerial perspectives

3. Develop and test a customised theoretical model depicting the main factors influencing citizen adoption of e-government services in Egypt. (This model integrates the TAM framework with a set of important factors identified from

literature to be most relevant to e-government adoption, namely website design, Government and Internet Trust, Perceived Public Value and demographic factors.)

4. Explore the relative importance of each factor for citizen adoption of e-government services.

5. Generate insight into the e-government phenomenon by providing some explanations for the findings, and suggesting some recommendations, and future directions.

Figure 1.2 below demonstrates the relationship between the research objectives and the research question, sub-questions, and research methods

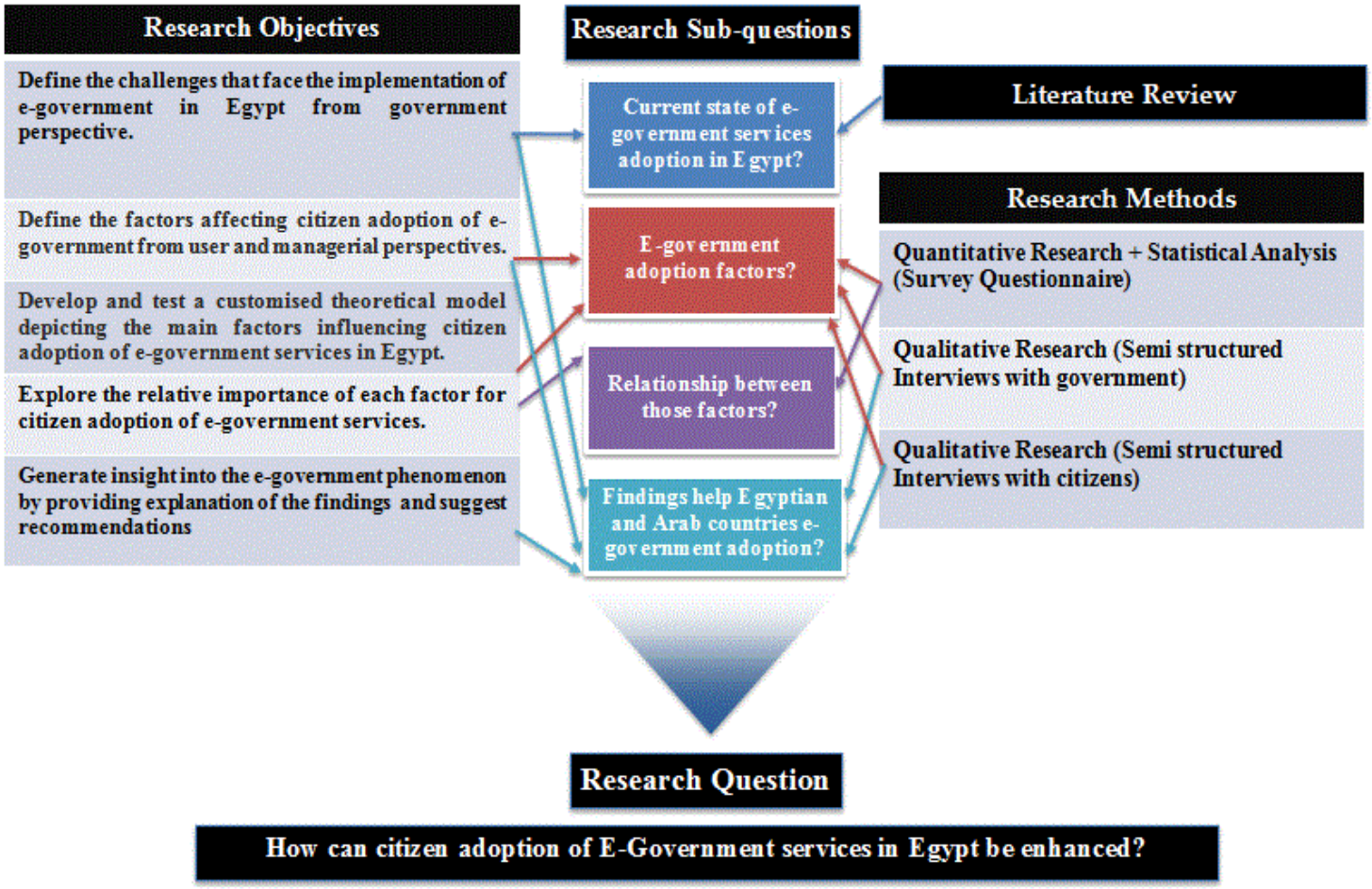


Figure 1.2: Diagram showing the relationship between the research question / sub-questions, objectives and methods

1.5. Research Significance, Benefits and Beneficiaries

Although the literature reports, as shown in the next chapter, that there are several studies on the e-government adoption conducted in the developed countries, there is a lack of empirical e-government adoption research that focuses on the adoption of such services in the Arab world including Egypt as will be demonstrated in the consequent chapter. Filling this gap in the literature is one of the benefits for conducting this study in a country such as Egypt, with different cultures and social values.

In addition, as mentioned earlier in this chapter, the literature reports the low level of citizen adoption of e-government services. The global average for government website usage by citizens is about 50% (UN E-Government Survey 2014). This low rate of e-government adoption is particularly noticeable in Egypt, as evidenced later. Therefore, empirical research in this area is a significant benefit, since it is likely that it will shed light on the important factors that may influence citizen adoption of e-government services. Identifying such factors will improve the likelihood of increasing the adoption rate of these services, by deepening the knowledge about the factors, which facilitate or hinder the adoption process.

The outcomes of this research are also believed to be of possible interest to the following beneficiaries:

1. Government officials who are managing e-government projects. The study as a whole is directed to meet the needs of this group by identifying the factors affecting citizen adoption of e-government services.

2. Officials responsible for e-commerce from the private sector. Considering the similarities between e-government and e-commerce, (as they both are services

offered to citizens online) they could benefit from the outcomes of this study to increase the rate of adoption of e-commerce services.

3. Researchers in the e-government area. The outcomes of this research will highlight the critical factors associated with e-government adoption in Egypt. Scholars may further explore in depth each factor, and its effects on different societies, and / or attempt to cover more variables.
4. The ultimate beneficiaries would be the users / citizens who will have more efficient e-government online systems to deliver their required services.

1.6. Research Methods

Choosing appropriate research methods to conduct the study is an essential part in defining the steps to be taken to answer the research questions (Leedy, 2005). The combination of qualitative and quantitative research methods has received increased attention from IT/IS researchers (Myers, 1997). Diversifying the research methods is known as triangulation, which allows a better understanding of the research phenomenon, as multiple research methods increase the validity of the collected data and derived outcomes (Bouma, 1996). Therefore, a combined approach of qualitative and quantitative research strategies were used to explore the objectives of this research. They were used in complementary manner as described in the **Methods chapter** (**section 4.3,4.4**).

Generally Quantitative research enabled the researcher to test the relationship between the research model variables and to provide evidence to support or disprove the research hypothesis (will be explained later in **chapter 3**)(Lee et al., 2005; Moon and Kim, 2001). This was done by analysing the results of an administered survey questionnaire to a random sample of the population in Egypt (adopters and non-adopters of e-

government) as explained in the subsequent **Methods chapter (section 4.4.1, 4.4.2)** and utilising statistical analysis techniques to test the derived model. Qualitative research was hence conducted in 2 forms.

1. Through semi-structured interviews with the e-government officials in the Ministry of Communication and Information Technology (MCIT), the National Information Technology Centre in Egypt (NITC)
2. Through semi-structured interviews with Egyptian citizens.

These enabled the researcher to understand in depth, the factors that influence the adoption of e-government services by the Egyptians from managerial and customer perspectives. It also provided an insight into the main challenges facing e-government implementation and provided up to date information about e-government in Egypt. The semi structured interviews allowed the comparison of the theoretical findings with the actual practice. The researcher administered the survey, and then conducted both kinds of interviews as shown in **Figure 1.2** above.

1.7. Research Contribution to Knowledge

The contributions to knowledge in the field of Information Systems made by this research are (as illustrated in **Figure 1.3**):

1. A conceptual model of user-related factors to enhance citizens' e-government adoption. This is developed and empirically validated, integrating a well-known and widely used adoption model (TAM) with a set of existing and new external factors identified in the literature, that are considered to be the most relevant to e-government adoption.
2. An inventory of governmental, political and social factors, that impact the citizens' decision to adopt e-government services, provided for both practitioners and researchers. This could help them to better position their nation-wide strategies to encourage faster and more efficient adoption of these services.

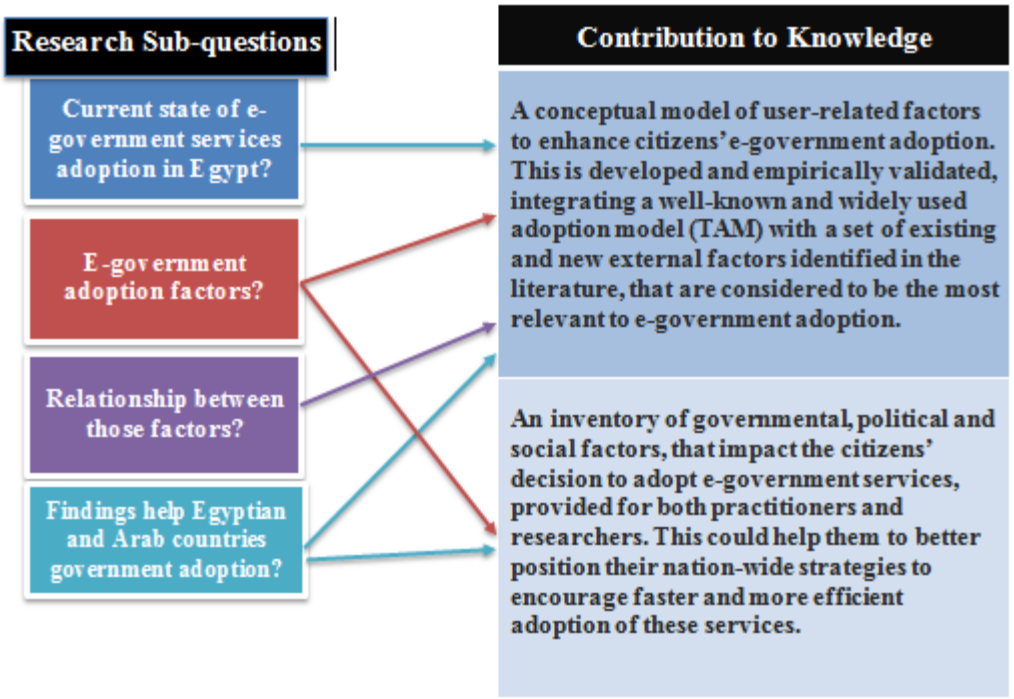


Figure 1.3: Relationship between Contributions to Knowledge and Research sub-questions

1.8. Thesis Structure

This section provides an overview of the entire contents of the thesis, which starts with this chapter. The structure of the thesis is represented in **Figure 1.4** below.

Chapter 2 'Literature Review': The chapter provides a critical review of the existing literature in order to present what is already known about e-government adoption, and to identify any important issues related to e-government adoption. The chapter is organised as follows. First, it provides an overview of e-government, its definition, and its benefits and limitations. Second it talks about the model of technology adoption in order to identify the most appropriate theoretical background for this research.

Chapter 3 'Research Model and Hypotheses': describes the development of the research model that will be the theoretical base for this research. After a short

discussion of the theoretical model components, the rationale for the relationships within the proposed theoretical model and research hypothesis are discussed.

Chapter 4 'Research Methods': discusses the research methods and design of this study. The chapter is organised as follows. First, a brief overview of different research approaches, methods and strategies is given, followed by a justification for the choice of methods for this research, the data collection techniques, sampling strategy, instrument design, and sample techniques are then presented and details of the two phases (quantitative and qualitative) in which the research was conducted are explained. Then it describes the analysis approach for both methods. The chapter also discusses ethical consideration pertaining to the data collection methods.

Chapter 5 'Quantitative Data Analysis and Discussion': provides a description of empirical data findings and analysis of data collected from the questionnaires. The chapter shows how the analysed results are linked to the research question by testing the research hypotheses. Finally, a discussion of the empirical findings and interpretation of results is provided including the differences between e-government adopters and non-adopters.

Chapter 6 'Qualitative Analysis and Discussion': presents the results of analysing the semi-structured interviews conducted with key e-government officials in Egypt and Egyptian citizens. The aim of conducting these interviews was to supplement the findings of the questionnaire survey. As they are responsible for e-government planning, development and management in Egypt, senior managers from the e-government Program Management Office (PMO) at the Ministry of Communication and Information Technology (MCIT) and The National Information Technology Centre (NITC) in Egypt were interviewed to explore important issues of e-government

adoption in Egypt from a managerial perspective. Finally it provides a discussion of the empirical findings and interpretation of results.

Chapter 7 'Conclusion': Summarizes the research, shows how the implications of the findings affect the adoption of e-government as well as discusses implications and contributions to knowledge. The chapter also discusses future works, strengths and limitations.

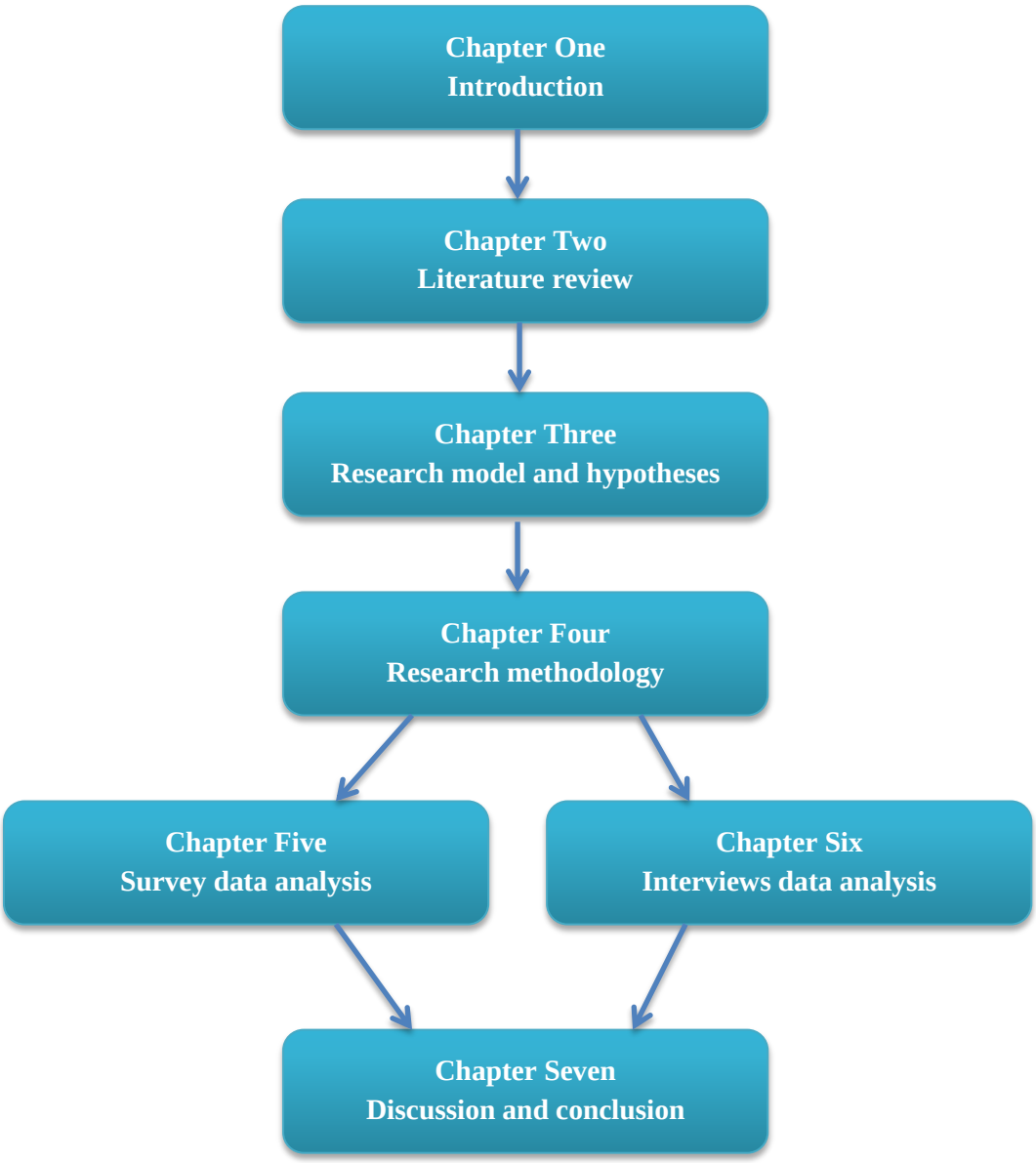


Figure 1.4: Thesis outline

1.9. Summary

In this introductory chapter, the foundation for the thesis investigation has been outlined and justified. The research questions, objectives and methods were briefly discussed in order to shed more light on the way data were collected and analysed. In addition, research scope, implications and the study significance, contributions to knowledge and beneficiaries were also covered before the thesis outline concluded this chapter.

2 Literature Review

2.1 Introduction

This chapter seeks to define the e-government concept and its key characteristics, including: definitions, benefits, challenges and stages of e-government maturity. It investigates the state of e-government development in developing countries, with a focus on the Arab World and Africa. It also examines existing technology adoption models in order to identify the most appropriate theoretical background for this research. The following diagram shows the chapter outline

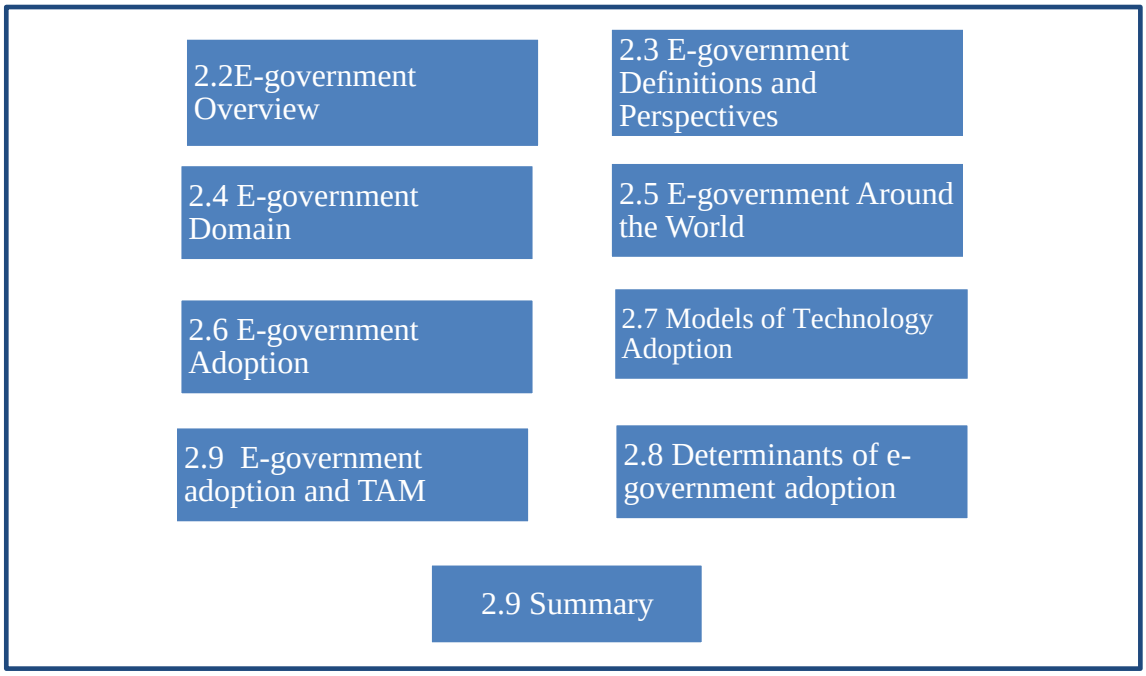


Figure 2.1: Chapter Outline

2.2 E-government Overview

The first decade of the 21st century has witnessed the confluence of two powerful, long-term trends in the business world: the shifting of the economy from goods to services,

and the rapid expansion of the information economies and electronic networks. This has given rise to the era of "e-service". In the academic community there is an increased interest among researchers in understanding how e-servicing impacts on citizens; their satisfaction, their loyalty, their service quality expectations, and how this knowledge leads to better frameworks for e-service provision (Rust and Kannan, 2002; Boyer et al., 2002; Chatfield and Al Hujran, 2007; Esteves and Joseph, 2008, Abdel-Fattah, 2015).

In the government context, the evolution of "e-government" can be attributed mainly to the prevalence of the information age, since the expansion of Information Communication Technology (ICT) has affected the functions and roles of governments (Palanisamy, 2004). ICT is becoming a need not a choice for government to survive in the digital economy (AL-Rababah & Abu-Shanab, 2010). That is why e-government has been identified as one of the top priorities for governments across the world. Although ICT has been utilised in government for more than 30 years, the e-government era from 2000 onwards, in particular, has been seen as a breakthrough for those with technology-driven views on change in government (Andersen et al., 2010). On a global scale, there is a set of labels, such as e-government, e-governance, one-stop government, digital government, and online government that reveal the governmental quest for transformation. This is done by pushing and pulling those within government, citizens and relevant private sector actors to adapt to the use of ICT in actions such as the use of online government services.

Organisations and agencies are rapidly setting up e-government systems to provide effective services not only to citizens, but also to private businesses and public administration (Chen et al., 2006). It is an opportunity for governments to take advantage of the new opportunities offered by this expansion of ICT. This would help them embrace remarkable processes of reformation to improve their performance, enhance transparency and provide greater simplicity in their relations with citizens and

businesses, after suffering from administrative incompetence and a lack of fast and effective services.

2.3 E-government Definitions and Perspectives

There are many definitions of e-government that have emerged and been dealt with in papers published over the past decade. Despite its relatively short history, research on e-government has been strongly characterised by a multidisciplinary nature (Lee et al., 2008). Therefore, the definition of e-government is a diverse and debatable issue, with a broad range of authors, papers, and disciplines contributing to it. The definitions also differ depending on e-government interests and perspectives as well as the community goals and values (Lowery, 2001). With all these definitions, Halchen (2004) claims that there is no universally accepted definition of the e-government concept. However it is argued that when the government is electronic, that means it has electronic databases and communication channels so that the public organisations and agencies can exchange information electronically not manually or paper-based.

Table 2.1 illustrates the different definitions of e-government found in literature. Although it is beyond the scope of this thesis to investigate all e-government definitions, the aim behind illustrating those definitions is to explore the main e-government characteristics (highlighted in red) identified from these definitions to aid in identifying the characteristics to be investigated in this research that affect e-government services' adoption.

For the purpose of this research, the researcher defined e-government as the use of ICT in the government organisation to improve efficiency and effectiveness in government administration; and to provide electronic services to other stakeholders including citizens and businesses.

Table 2.1: Definitions of E-government

Authors	Definition
Belanger and Carter, 2008	The use of information technology to enable and improve the ***efficiency*** with which government services are provided to citizens, employees, businesses and agencies.
Chen et al., 2007	"Digital" government is the initiative taken by governmental agencies and organisations to use the Internet technology in increasing their working ***effectiveness and efficiency***.
Jones et al., 2007	Constitutes a burgeoning phenomenon with huge investments being made to modernise public sector institutions at all levels. It is a dramatic change and problematic in any organisation, and the ***political, managerial and cultural environments*** set within government present an additional challenge.
Gunter, 2006	The use of information and communication technologies (ICT) in orders to deliver public services to citizens and businesses, and entails the transformation of public services available to citizens using new organisational processes as well as new ***technological*** trends.
InfoDev, 2002	The use of (ICT) to transform government by making it more ***accessible, effective and accountable***.
Aldrich et al., 2002	Exploiting the power of information to help transform the ***accessibility***, quality, and to help revitalize the relationship between customers/citizens and public bodies who work on their behalf.
United Nations, 2002	The use of all information and communication technologies, from fax machines to wireless palm pilots, to ***facilitate the daily administration*** of government.
AFFIRM, 2001	Electronic government should enhance the ability of citizens, business and government to engage in transactions with the public sector. It is also about ***saving money and increasing efficiency***.

Some of the characteristics that had been extracted from those definition to be used in this research were the accessibility of the website , the values gained by the customers from using electronic government for example saving money, the effectiveness of the data in the website

The absence of agreement on the definition of e-government could also be the result of viewing e-government from different perspectives, for example, those of societies, businesses, economies, services, organisations and politics. The definition could also vary according to the values, goals and cultures of a community as the United Nations (2002) argues that due to some economic and cultural conditions in some countries, electronic government could be the only means of reaching a reasonable level of electronic transaction with different stakeholders (Stoltzfus, 2005; Yildiz, 2007).

2.4 E-government Domain

The relevant stakeholders are not just those who make use of the service. They can be involved in any stage of electronic service development and delivery for example those who are responsible for organising and supervising public services (Vassilakis et al., 2005) or those who possess and provide the necessary background knowledge for designing and implementing services. Also they can be those who provide the necessary technological knowledge or the development of the service, adopters who contribute to getting others ready for the electronic service (Heeks, 2006), or end-users who make use of the service. Even the end users being served by government can be grouped according to the extent to which the service is designed to help them.

Most of the existing literature refers to four types of e-government interactions (Rust and Kannan, 2002; Seifert and Petersen, 2002; Evans and Yen, 2005; Siau and Long, 2005):

1. Government-to-citizens (G2C): government aims to interact with citizens.
2. Government-to-business (G2B): government aims to interact with business enterprises.
3. Government-to-government (G2G): government aims to make services more friendly, convenient, transparent, and inexpensive.

4. Government-to-Employee (G2E): government aims to empower employees to assist citizens in the fastest and most appropriate way, speed-up administrative processes, and optimise governmental solutions.

Among the four areas, G2C and G2E involve interaction and cooperation between government and individuals, while G2B and G2G deal with the relationship between government and organisations. Moreover, G2C and G2B involve external interaction and collaboration between government and outside institutes, such as individual citizens and businesses; while G2E and G2G involve the internal interaction and cooperation between governments and their employees, as well as between governments at different levels and distributed locations.

This research will focus on G2C. Bonham *et al.*, (2001) report that G2C initiatives are designed to facilitate citizen interaction with government, which is what some observers perceive to be the primary goal of e-government (Seifert, 2008; Carter and Bélanger, 2005). These initiatives attempt to make transactions, such as renewing licenses and certifications, paying taxes and applying for benefits, less time consuming and easier to carry out. G2C initiatives also often strive to enhance access to public information through the use of dissemination tools, such as Web sites and/or kiosks. Some e-government advocates suggest that one of the goals of implementing these initiatives should be to create a "one-stop shopping" site where citizens can carry out a variety of tasks, especially those that involve multiple agencies, without requiring the citizen to initiate contacts with each agency individually. A potential outgrowth of G2C initiatives is that they may facilitate citizen-to-citizen interaction and increase citizen participation in government by creating more opportunities that overcome possible time and geographic barriers, thereby connecting citizens who may not ordinarily come into contact with one another (Seifert and Petersen, 2002). Although e-government has clear benefits for businesses and governments themselves, citizens may actually receive the

widest array of benefits from e-government. G2C initiatives can facilitate involvement and interaction with the government, enhancing the *"degree and quality of public participation in government"* (Kakabadse *et al.*, 2003). G2C interactions can allow citizens to be "*more informed about government laws, regulations, policies, and services"* (Muir and Oppenheim, 2002).

For the citizen, e-government can offer a huge range of information and services, including information for research, government forms and services, public policy information, employment and business opportunities, voting information, tax filing, license registration or renewal, payment of fines and submission of comments to government officials'. To provide citizens with personalised services, governments must make all information and services available from a single-integrated source (Reffat, 2003). Through portals and one-stop shops, the web can be used to create a single face to the public, hiding the internal complexity of government. Also, through a single access point, citizens can better articulate their expectations and needs from government. It reinforces their participation in local community life and the democratic process since they can interact with government and access public information, official documents and administrative proceedings (Reffat, 2003). For those who do not have time to go to city hall or committee hearings to participate in public debates, they can instead send an email or contribute to an online discussion forum. Based on the aforesaid G2C conceptions, the following objectives can be related to the G2C dimension:

- To provide one-stop, on-line, access to information to individuals.
- Citizens should be able to find what they need quickly and easily.
- Receiving services should be citizen-focused and not agency focused.
- Disintermediation of civil service staff, i.e. delivering services directly to citizens.

- Building and enhancing trust.

As a summary, the previous section provides evidence for the importance of enhancing adoption of electronic government services which is the focus of this research.

2.5 E-government Around the World

Growing access to ICT has encouraged many governments to integrate new technology into their national economic development strategies (Tahrani, 2010). It is becoming an increasingly important public service tool for many governmental departments around the world (Nour et al., 2008), and the scale of activity on the part of public sectors in leveraging IT has increased in volume (Smith, 2008). The vast majority of public organisations around the world have established websites and provide public information to citizens (98% with website – 2% without websites) (United Nation, 2010). In addition, many transactions are now conducted online; these include, applying for jobs, completing tax returns and renewing drivers' licenses (West, 2004). However, financial transactions and opportunities for interactive political and policy participation are limited (Holden, 2003, Šèeulovs et al., 2015).

There are differences in the adoption and implementation of e-government within government organisations at a national and international level (Heeks, 2002; Moon, 2002). These differences can be attributed to the individual organisational requirements, circumstances, readiness, structure, size and cultures (Lam, 2005).

This section describes the e-government experiences of several governments. It begins by presenting experiences from both developed and developing countries, and then it moves to the e-government initiative in Egypt.

2.5.1 Developed Countries versus Developing Countries

Although e-government technologies have the potential to improve the lives of the world's population, particularly those who live in developing countries, the developed

countries such as the U.S., Canada, UK, Australia, Norway and Germany have so far been the leaders in e-government (Accenture, 2010), reaping the vast majority of initial gains of e-government implementation. The developed countries continue to launch multi-year programs to create more citizen-centred, effective and efficient governments using web technology (Chan et al., 2010).

Actually, the gap between developed and developing countries in Internet technological infrastructures, practices and usage has been wider rather than narrower over years (Chen et al., 2006, Khoury et al., 2015). Besides the lack of sufficient capital to build up an expensive national information infrastructure on which e-government is based, developing countries also lack sufficient knowledge and skill to develop suitable and effective strategies for establishing and promoting e-government (Khoury et al., 2015).

Every year, the UN releases a report on the developing countries and compares their economic conditions in several different categories. These countries were chosen based on their low GDP per capita, their weak human assets and their high degree of economic vulnerability (Chen et al., 2006). For example : According to its recent release (United Nations, 2010), it has found that many developing countries have been investing in streamlining their national and ministry portals and websites to offer more e-services and more actively engage citizens in dialogues with government. Also, the digital divide between the developed countries and developing countries is gradually closing in the e-government arena.

Table 2.2: Developed vs. developing countries Source: (Chen et al., 2006, Diaz et al., 2015)

Differences	Developed	Developing
Technical Staff	Has a current staff, needs to increase technical abilities and hire younger professionals Has outsourcing abilities and financial resources to outsource; Current staff would be able to define requirements for development	Does not have a staff, or has very limited in-house staff Does not have local outsourcing abilities and rarely has the financial ability to outsource; Current staff may be unable to define specific requirement
Infrastructure	Good current infrastructure High Internet access for employees and citizens	Bad current infrastructure Low Internet access for employees and Citizens
Citizens	High Internet access and computer literacy; still has digital divide and privacy issues Relatively more experienced in democratic system and more actively participate in governmental policy-making process	Low Internet access and citizens are reluctant to trust online services; few citizens know how to operate computers Relatively less experienced in democratic system and less active participation in governmental policy-making process
Government Officers	Decent computer literacy and dedication of resources; many do not place e-government as a high priority	Low computer literacy and dedication of resources; many do not place e-government at a high priority due to lack of knowledge on the issue

As we can see lack of technical staff, infrastructure, citizen and government officer IT literacy all have an adverse effect on e-government adoption, which is to be investigated in this research

2.5.2 E-government in Egypt

In order to understand the key factors that affect e-government development in Egypt, it is useful to provide a description of the current Egyptian approach to e-government. This description will begin with a brief history of the country's background to set the scene for the environment that e-government adoption resides in, and then focus on the e-government programme background, the ICT initiatives within the Egyptian government and its partnership with international corporations.

Background of Egypt

Egypt possesses a diversified economy, with sectors such as tourism, agriculture, and industry. The Egyptian economy is rapidly developing, due in part to legislation aimed at luring investments, coupled with both internal and political stability, along with recent trade and market liberalisation. Economic conditions have started to improve considerably after a period of stagnation from the adoption of more liberal economic policies by the Government, as well as increased revenues from tourism and the stock market

The IMF report (2010) indicated that Egypt's economy is elastic to the economic crises. Sustained and wide-ranging reforms have reduced fiscal, monetary, and external vulnerabilities, and improved the investment climate. These reforms have bolstered the economy's durability and provided breathing space for appropriate policy responses. These developing conditions have encouraged the government to implement an e-government services strategy, the efficiency of which is under investigation in this research.

ICT Initiatives and government reform

The Government of Egypt realised that the development of a strong ICT sector is its key to fostering local competitiveness in the global arena. The ICT sector has expanded, operating with companies such as Microsoft, Oracle and other major corporations, as well as many small and medium enterprises. The sector has been stimulated by new Egyptian entrepreneurs with Government encouragement. To back up the sector, the government established the Ministry of Communication and Information Technology (MCIT) in October 1999. Empowered by strong executive privileges, the Ministry had two mandates. The first was to convert Egypt into an information society, and the second to create a vibrant and exportable ICT industry. Upon establishment, the Ministry laid down the national plan for ICT, which focused mainly around defining a

clear road map for Egypt to integrate smoothly in the global economy (MCIT, 2004). The Egyptian Information Society Initiative (EISI) was a major milestone for Egypt to bridge the digital divide and to convert to an Information Society.

E-government Initiative

Egypt has taken the e-government initiative, since the introduction of MCIT in 1999, as part of its plan to turn Egypt into an information-based society (Azab et al., 2009). Egypt's commitment to utilising technology for the purpose of economic and social progress was further realised when the Egyptian government announced an effective e-government program that integrates ICT technologies to deliver government services at citizens' convenience (MCIT, 2004).

The program officially started in July 2001 but had been planned since October 2000. The vision of the e-government initiative in Egypt was "delivering high quality government services to the public in the format that suits them". Such vision relied mainly on three principles (MCIT, 2004) that include:

- Citizen-centric service delivery: The program slogan is "government now delivers" which reflects the government's intention to develop a one-stop shop e-services approach focused on citizens' needs.

- Community participation: The EISI Government program is a project with nationwide impact, thus community participation is a must. Citizens' demands are constantly being analysed and reflected upon, and private/public sector companies are active participants in the project's implementation and management.

- Efficient allocation of government resources: The project proposes techniques for increasing the level of efficiency of the Egyptian Government. Productivity,

cost reduction, and efficient allocation of resources are among the major expected outcomes from project implementation.

The official inauguration of the Egyptian e-Government portal (www.egypt.gov.eg) took place on 25 January 2004, which was a major first step in coordinating and integrating government information and services. Available in both Arabic and English, the user-friendly portal targeted citizens, foreigners and businesses alike (United Nations, 2004). The target was making the beneficiaries feel a positive change by facilitating the services provided to them. The portal tailored government services to meet citizens' and investors' needs and expectations. The portal also introduced the Citizen Relationship Management culture (CRM) to the government, where citizens are viewed as customers and government organisations are constantly seeking their satisfaction. Investors came out as the main beneficiaries from that project.

Among the services that were placed in the portal as pilots were telephone e-billing and birth certificate issuing (Microsoft Egypt Press, 2004). Telecom Egypt (the national telephone service provider) offered online invoice query and payment via credit cards. Although payment online is still 5% of query transactions, it is considered a notable figure, given that credit card penetration in Egypt is still low and culture awareness of e-services is still in its infancy. Although at first the Egyptian e-government portal was not well integrated with, or promoted at other Egyptian government sites, this was the stage of e-maturity that Egypt had reached.

In 2004, the Ministry of State for Administrative Development (MSAD) became the organisation responsible for the e-Government program in Egypt. The MSAD perceived Information and Communication Technology (ICT) as a strategic tool that could be used in implementing the National Development Program, which seeks to raise the efficiency of the State's administrative bodies, and deliver governmental services to

citizens at a fast pace in an environment that is highly efficient and effective through various interactive service channels at their convenience (MSAD, 2010). Therefore, the Ministry now develops and implements a number of projects that achieve this vision through a system of integrated management for the modernisation of the Egyptian Government.

The first services offered through Egypt's gateway were electricity and telephone billing, and payment of traffic fines. MSAD moved in many areas for speedy implementation and launch of this strategic project. This included setting up the required infrastructure, i.e. laws and regulations, technological frameworks, government website, rules and specifications. This axis included issuance of four documents concerning government networks, security systems, safety and document handling systems. This is in addition to putting licence contracts for personal computer programs into effect in cooperation with Microsoft. The other axis included services surch as electronic payment of telephone and electricity invoices and the like. The third axis focused on the mechanisation of ministries' Cabinets and affiliated authorities. Contracts were concluded for the implementation of related applications on resource planning and management, including inventory, purchases, budget accounts, and personnel affairs. MSAD made great strides in the implementation of e-government.

Similar strides to overcome some barriers are needed so that Egyptian society can benefit from the services offered by the project. MSAD also included a special track for the automation of local governorates in the e-government project. This track aimed at simplifying procedures for local government bodies and establishing backend systems to support the online delivery of government services. Through this project, rural area residents would not have to go to service providers in the capital or the big cities and waste time and money.

Egypt's e-government program has identified a number of objectives to realise a successful implementation of e-government (MCIT, 2004; Azab et al., 2009) including:

- Delivering services to the public where they are, in the format that suits them, at the right time and allowing them to share in the decision making process.
- Creating an environment conducive to investors by streamlining procedures, easing access to government services and providing one-stop shopping for essential business services, thus encouraging foreign and local investment.
- Providing accurate and updated information to support the decision making process, and to help in planning and following up on the different long-term development initiatives.
- Deploying new philosophies and practices of modern management in the government in a mode that will make government operations more efficient and cost effective.
- Reducing government expenditure by introducing new models for procurement, and Enterprise Resource Planning.
- Fostering local competitiveness and increasing globalisation readiness to ensure the smooth integration of the Egyptian government in the global community, both regionally and internationally.

Egypt's e-government programme is in continuous progress , according to the united nation e-government survey (2014) report, Egypt was found from the countries with high e-government development index (EGDI) between 0.50-0.75. The report also stated that those countries with high EGDI have considerable opportunity to advance their e-government development. With clear strategies, smart investment in ICT infrastructure, continued investment in primary, secondary and tertiary education, as well as through radical transformation in offering online public services, governments

can achieve more to follow the upward trend. Which lead to the one of the importance of this research output which put eyes on the problems and that face the government in the implementation of e-government as will be explained in the qualitative result chapter and introduced solutions.

Government main objectives was to implement e-government successfully in order to deliver the services to the citizen and convince them to use it, but actually this is not the case , government had obstacles in the implementation process (explained in **chapter 6 section 6.2.4**) which lead to low level of e-government adoption. As stated in **chapter one (section 1.2**) the scope of this research investigate the adoption and implementation problem from both citizen and government point of views.

2.6 E-government Adoption

There is no clear definition of Government-to-Citizens (G2C) e-government adoption (Kumar et al., 2007). Researchers refer to it as the 'intention' (Carter and Belanger, 2005; Warkentin et al., 2002) or 'willingness' (Gilbert et al., 2004) to use e-government information and services. Warkentin et al. (2002) define e-government adoption as "the intention to engage in e-government, which encompasses the intentions to receive information, to provide information and to request e-government service". Similarly, Kumar et al. (2007) define it as "a simple decision of using, or not using, online services". For the purposes of this study, e-government adoption refers to the intention of citizens to use e-government information and services.

However, despite the diffusion of e-government websites and the growing investment in e-services at both national and local government levels, several researchers reported the problem of low level of citizen adoption of e-government services (Belanger and Carter, 2008; Kumar et al., 2007,Fu et al., 2006, , Hofmann et al., 2012, Lee et al., 2011, Muhammad et al., 2013, Rodrigues et al., 2016).

For example, Belanger and Carter (2008) found that despite the governments' growing investment in electronic services, citizens are still more likely to use traditional methods, e.g., phone calls or in person visits, than the internet to interact with government. While Kumar et al. (2007) also highlighted this problem when they found that the rate of adoption of e-government has globally fallen below expectations, although some countries are doing better than others and Muhammad et al (2013) discovered that despite the readily available tax preparation software and its promotion by the government, only 40% of all taxpayers switched to eTax and most taxpayers were unwilling to give up their paper forms. Thus, the problem of underutilisation still remained and plagued governments. The problem of low G2C e-government adoption also motivated Choudrie and Dwivedi (2005) to empirically examine the citizen awareness and adoption of e-government initiatives in the United Kingdom (UK). They concluded from the results of this research, that the government agencies could better understand the problem of low adoption of e-government.

In addition, prior research provided empirical evidence of a less than desired level of G2C e-government adoption in both developed, and developing countries. As expected, researchers who conducted G2C e-government adoption studies in developing countries reported significantly low levels of G2C e-government adoption.

Similarly, Jordan faces the problem of low level G2C adoption of e-government services. The Jordanian government announced some statistics about ICT usage by households in Jordan (MOICT, 2007). These results showed that only 31% of the households are aware about e-government services in Jordan. Another study in Kuwait also showed that only 23.6% of the respondents were using e-government services (AL-Awadhi and Morris, 2008).

Due to the notable low level citizen adoption of e-government information and services worldwide, several researchers (Hofmann et al., 2012, Lee et al., 2011) were suggesting the need for more research in the area of G2C e-government adoption. According to these researchers, this research assists governments to improve their understanding of the factors that affect citizen adoption of e-government services, and therefore take the necessary strategic actions to meet their citizens' needs.

From the light of the above discussion, it can be concluded that governments still face the challenge of the low level of G2C e-government adoption. However, while a large portion of the e-government adoption academic literature to date has focused on the national and local government's adoption of e-government, relatively little is known about why, and under what circumstances, citizens adopt e-government services (Alhujran and Chatfield, 2008; Carter and Belanger, 2005; Choudrie and Dwivedi, 2005; Gilbert et al., 2004; Tung and Rieck, 2005). Therefore, the main focus of this study is to investigate the determinants that influence citizen's adoption of e-government information and services in developing countries (Egypt).

2.7 Models of Technology Adoption

This section highlights the need for studies that investigate the adoption and citizens' 'behaviour' of e-government services, examines the theories that explain technology adoption that are relevant for this research, differences between them, and reasons behind using TAM theory in particular. The study of adoption, and its usage, is considered to be a mature area of research within the IS discipline (Venkatesh et al., 2003; Hu et al., 1999). Over the last three decades, a number of researchers have adopted, modified and validated many theoretical models in order to understand and predict technology acceptance and usage (Venkatesh et al., 2003; Hu et al., 1999). The

models that have been taken and used from another discipline and developed by IS researchers, include:

- Theory of Reasoned Action (TRA) (Fishbein and Ajzen, 1975);
- Innovation Diffusion Theory (IDT) (Rogers, 1995);
- Theory of Planned Behaviour (TPB) (Ajzen, 1991; 1985; Ajzen and Fishbein, 1980);
- Technology Acceptance Model (TAM) (Davis, 1989; Davis et al., 1989);
- Diffusion of Innovation Theory (DOI) (Rogers, 1995).

Venkatesh et al., (2003) argue that researchers are able to choose a suitable and favoured model and ignore the contributions from alternative models. This led Venkatesh et al., (2003) to review, discuss and integrate elements across eight prominent user acceptance models (TRA, TAM, the Motivational model, TPN, a model combining the Technology acceptance model and the TPB; MATH, DOI, and the Social cognitive theory) that resulted in proposing:

- Unified Theory of Acceptance and Use of Technology (UTAUT) (Venkatesh *et al.,* 2003).

Some of these theoretical models are considered and believed to be the most robust and significant in describing IT/IS adoption behaviour. The following paragraphs offer a brief explanation of these technology acceptance theories.

2.7.1 Theory of Reasoned Action (TRA)

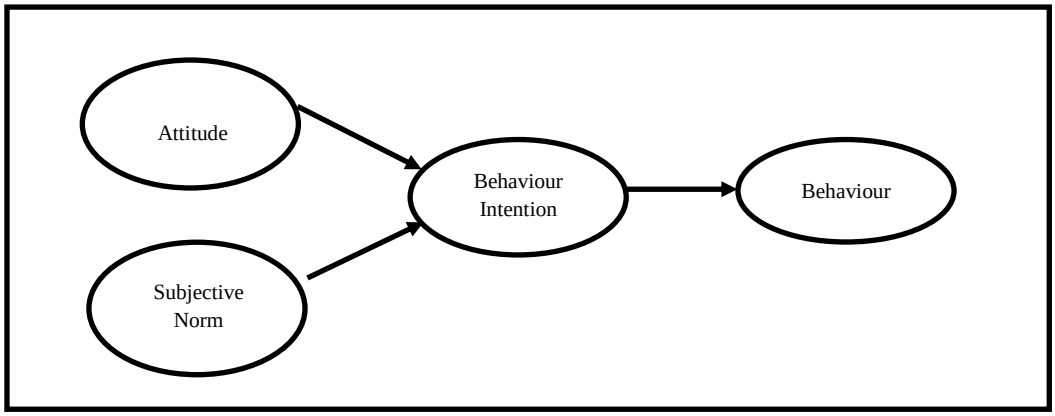


Figure 2.2: Theory of Reasoned Action (TRA). Source: Ajzen & Fishbein, (1980)

TRA (Fishbein and Ajzen, 1975; Ajzen and Fishbein, 1980) is a well-accepted and widely studied intention model that has been used successfully to explain behaviour across a wide variety of settings (Chau, 1996; Chen et al., 2002, Davis et al., 1989; Karahanna et al., 1999; Venkatesh and Smith, 1999). According to TRA (**Figure 2.2**), an individual‘s behaviour is best predicted by his/her behavioural intention, which in turn is determined by the person’s attitudes and subjective norm. Behavioural intention refers to the strength of one’s intention to perform a specified behaviour (Davis at al., 1989). Subjective norm is defined as beliefs about what others will think about the behaviour (Fishbein and Ajzen, 1975). That is if an individual believes that most of the people who are important to him perceive the outcome of performing the behaviour as positive, he/she will be more likely to perform the behaviour. TRA is originally based upon the aim to explain strong-willed behaviour. TRA scope of behaviours therefore excludes a wide range of behaviours that are for instance impulsive, spontaneous, the result of cravings, or simply mindless because their performance may not be completely voluntary or because the engagement into these behaviours is not out of conscious intention of the actor to do so (Beekens, 2011). Also, TRA excludes behaviours that require specific skills, unique resources, or the cooperation of other people in order to perform (Beekens, 2011; Ajzen & Fishbein, 1980). In this research study, users need

specific skills, experiences and base of the understating of Internet technologies to be able to have clear behavioural intention on the acceptance of E-government, hence this model was not adopted for usage.

2.7.2 Theory of Planned Behaviour (TPB)

To overcome the limitation of TRA, Ajzen (1985) extended TRA by adding a third perception "Perceived Behaviour Control" (PBC). This modified model of TRA is named TPB, which is considered as one of the most influential theories in predicting and explaining behaviour (Sheppard et al., 1988). Various studies showed the applicability of TPB to various domains, and verified the ability of this theory in providing a valuable framework for explaining and predicting the acceptance of new information technology (Hung et al., 2006). The new construct PBC was defined as the "perception of ease or difficulty of performing the behaviour of interest" (Ajzen, 1991). According to his theory (**Figure 2.3**), people's behaviour is determined by their intentions to perform the behaviour, where their intentions are influenced by attitudes towards behaviour, subjective norms, and perceived behavioural control. In the second version of TPB, Ajzen and Madden (1986) argued that perceived behavioural control can directly influence performed behaviour when it accurately reflects actual control. Again in this research study, users need specific skills, experiences and base of the understating of Internet technologies to be able to have clear behavioural intention on the acceptance of E-government, hence this model was not adopted for usage.

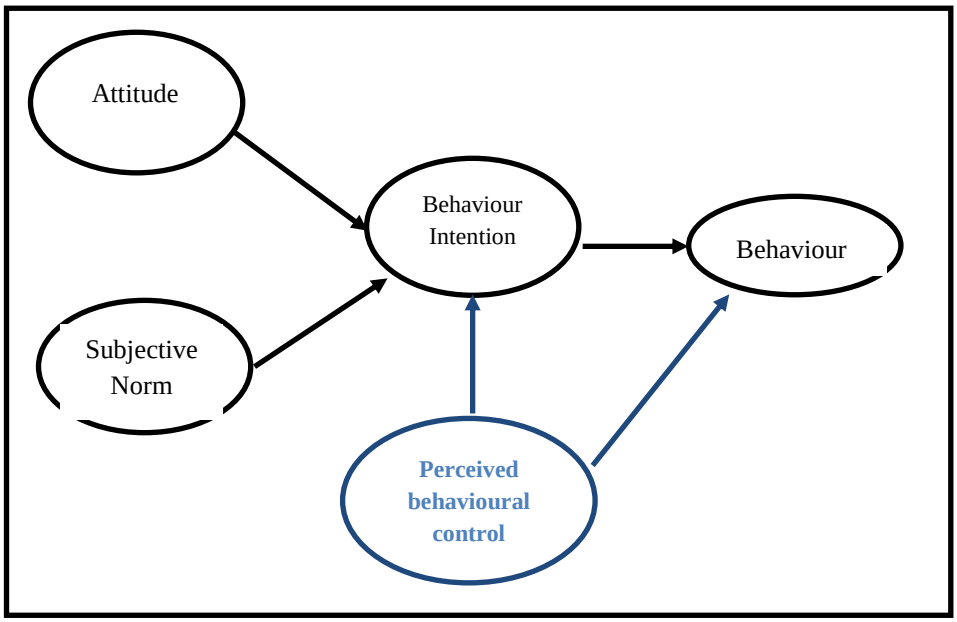


Figure 2.3: Theory Planned Behaviour (TPB). Source: (Ajzen, 1991)

2.7.3 Unified Theory of Acceptance and Use of Technology (UTAUT)

Venkatesh et al. (2003) introduced the Unified Theory of Acceptance and Use of Technology (UTAUT) (**Figure 2.4**) by synthesising construct from eight existing technology acceptance models: the TRA, TAM, TPB, the Motivational Model (MM) (Davis at al., 1992), the combined TAM and TPB (C-TAM-TPB) (Taylor and Todd, 1995), the Model of PC Utilization (MPCU) (Thompson at al.,1991), DOI and Social Cognitive Theory (SCT)(Campeau and Higgins,1995). The authors argue that UTAUT provides a useful tool for managers to assess the likelihood of technology acceptance in the organisational context. According to this theory, the core determinants of user's acceptance and usage behaviour are (Venkatesh et al., 2003):

- **Performance expectancy:** This is "the degree to which an individual believes that using the system will help him or her to attain gains in job performance"
- **Effort expectancy:** This is "the degree of ease associated with the use of the system".
- **Social Influence:** which is "the degree to which an individual perceives that important others believe he or she should use the new system".

- **Facilitating Condition:** "the degree to which an individual believes that an organisational and technical infrastructure exists to support the use of the system".

UTAUT also suggests that the variables of gender, prior experience, age and voluntariness moderate the main relationship in the model. However, the empirical results show that computer anxiety, computer self-efficiency, and attitude towards the use of technology were not significant determinants of the usage intention (Venkatesh et at., 2003). These constructs were not included in the final model, therefore, this research did not use this model because the Attitude construct was omitted from the model.

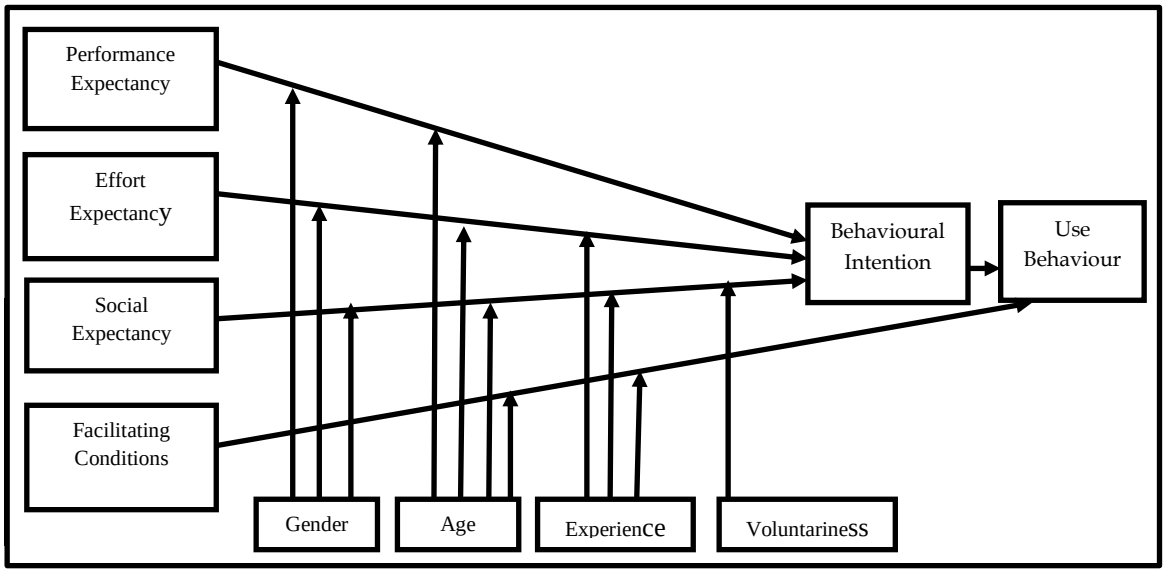


Figure 2.4: Unified Theory of Acceptance and Use of Technology (UTAUT). Source: Venkatesh et al. (2003).

2.7.4 Technology Acceptance Model (TAM)

The Technology Acceptance Model (TAM) (Davis, 1989; Davis et al., 1989) is one of the various models that IT/IS researchers have used to predict and explain the underlying factors that motivate users to accept and adopt new information technology systems. This model (**Figure 2.5**) is derived from the theory of reasoned action (TRA) mentioned above (Fishbein and Ajzen, 1975; Ajzen and Fishbein, 1980).

TAM differed from TRA in two aspects. First, TAM introduced two new constructs, perceived usefulness (the belief that using an application will increase one's performance) and perceived ease of use (the belief that one's use of an application will be free of effort). In TAM, both perceived usefulness and perceived ease of use could predict an individual's attitude concerning the use of an application. Second, TAM did not include subjective norm as a determinant of intention. Since its introduction by Davis (1989) and Davis et al. (1989), TAM has been widely used for predicting the acceptance, adoption, and use of information technologies. As suggested by Legris et al. (2003) and Serenko et al. (2008), the power of prediction and explanation of TAM should be enhanced through the integration of other situation or technology-specific constructs. **Figure 2.4** illustrates TAM constructs and their relations.

There are two determinants including perceived ease of use and perceived usefulness. Both positively affect the attitude (which is defined as an individual's positive or negative feelings (evaluative affect) about performing the target behaviour toward an information system) and further, positively affect the individuals' intentions to use and the acceptance of the information system (which is defined as Strength of one's intention to perform a specified behaviour). In addition, perceived ease of use positively affects the perceived usefulness, and both of perceived ease of use and perceived usefulness are influenced by external variable.

While TRA and TPB have the capability to explore the system usage by incorporating subjective norms and perceived behavioural controls with attitudes toward using technology, Technology Acceptance Model is more appropriate to be applied in online contexts for several advantages. First, Technology Acceptance Model is specific to information system usage for applying the concepts of ease of use and usefulness. Furthermore, Technology Acceptance Model is more robust in various information system applications Chen et al (2011).

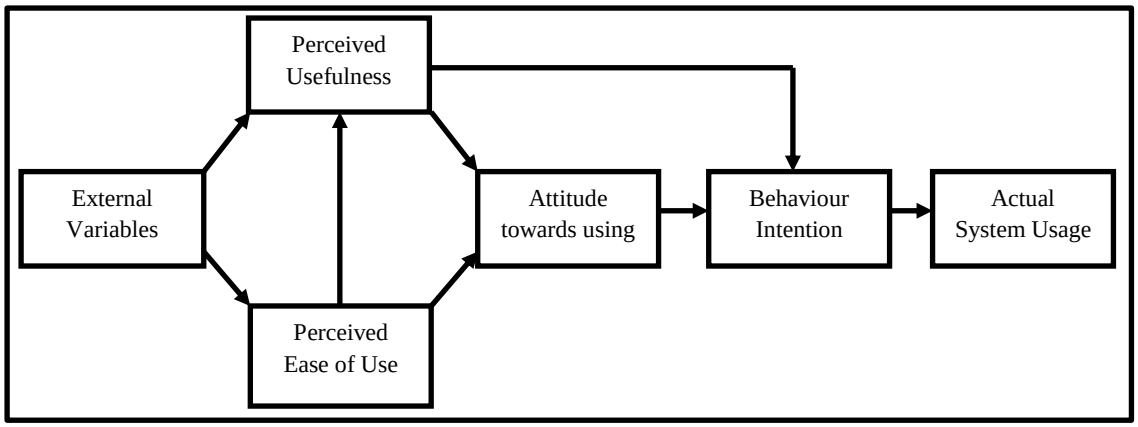


Figure 2.5: Technology Acceptance Model. Source: Davis et al. (1989)

Advantages of TAM

Several meta-analysis studies have provided sufficient data about TAM to be highly credible (Ma and Liu, 2004; King and He, 2006; Shumaila et al., 2007), and routinely explain up to 40 per cent of the behavioural intentions to use (Burton-Jones and Hubona, 2006; Venkatesh and Davis, 2000). It also received substantial empirical support by means of validations and replications from numerous researchers (Adams et al., 1992; Davis, 1993; Davis et al., 1989; Igbaria, 1993; Venkatesh and Davis, 2000). In addition, several studies have applied TAM to evaluate users' adoption in different settings such as e-mail, voice-mail, graphics, spreadsheet, and word processing software (Adams et al. 1992; Davis et al., 1989; Davis, 1993); electronic commerce (Gefen et al., 2003; Gefen, 2000; Moon and Kim, 2001); electronic learning (Martins and Kellermanns, 2004; Arbaugh, 2000); internet banking (Al-Sukkar and Hasan, 2005; Chan and Lu, 2004; Lai and Li, 2005); and e-government (Al-adawi et al., 2005; Fu et al., 2006; Warkentin et al., 2002).

Attitude construct in the TAM

Fishbein and Ajzen (1975) defined attitude as "an individual's positive or negative feelings (evaluative affect) about performing the target behaviour". They also differentiate between two different types of attitudes: attitudes toward objects (e.g., 'the e-government system is great') and attitudes toward behaviours (e.g., 'using the e-

government system is great') (Hartwick and Barki, 1994). According to this distinction, a citizen's attitude toward an e-government system would be considered an attitude towards an object, while a citizen's attitude toward using e-government services would be considered an attitude towards behaviour.

However, although the original TAM included the attitude toward behaviour as a mediator between the beliefs and the intention to use, some researchers question the full mediation of beliefs by attitude (e.g Davis et al., 1989; Davis, 1993; Taylor and Todd, 1995). For example, Davis et al. (1989) did not find empirical support for the significant role of the attitude as a full mediator. This is justified by Davis and Venkatesh (1996), as "in work settings, people may use a technology even if they do not have a positive attitude (affect) towards using the same, because it may provide productivity enhancement (i.e. be useful)". Based on this empirical evidence, the newer variations of TAM such as TAM2 (Venkatesh and Davis, 2000) and the Unified Theory of Acceptance and Use (UTAUT) (Venkatesh et al., 2003), have dropped the attitude construct. These new models have created a direct path between perceived usefulness and intention in order to reflect performance expectancy impact, regardless of individual's affective reaction towards the new IT/IS (Davis et al., 1989).

Other studies (Thompson et al., 1991; Taylor and Todd, 1995) have also reported similar results, and found that attitude may not be an important determinant of an intention to use, especially in the settings where the intention to use will be formed based on performance considerations (e.g. organisational context), rather than on personal likes or dislikes (Taylor and Todd, 1995). However, although Davis et al. (1989) found that the attitude did not fully mediate the effect of beliefs on intention, the same study admitted that 'more research is needed to identify the conditions under which attitudes mediated the belief-intention link' (Davis et al.,1989). This motivated Yang and Yoo (2004) to revisit this construct. They suggested that the attitude has two

components: affective and cognitive. The affective component refers to “how much the person likes the object of thought, while the cognitive component refers to an individual's specific beliefs related to the object of thought”. The result of this study showed that the attitude construct is a significant factor in explaining the IS usage when considering the cognitive aspect. In addition, several studies (e.g. Bhattacherjee and Premkumar, 2004; Heijden, 2003; Mathieson, 1991; Yang and Yoo, 2004) support the significant role of the attitude in predicting the intention to use IT/IS systems.

Moreover, in voluntary settings such as e-commerce, e-banking and e-government, attitude has been shown to have a high correlation with behavioural intentions to use (Chang et al., 2005; Chen et al., 2002; Heijden, 2003; Hung et al., 2006; Pavlou and Fygenson, 2006; Shumaila et al., 2007). Pavlou and Fygenson (2006) argued that although prior TAM research showed that the attitude does not fully mediate the effect of beliefs on intention to use IT, these results should not necessarily generalise to other domains such as ecommerce. Hartwick and Barki (1994) also observed an important difference between voluntary and mandatory users of IT/IS systems. Mandatory users mainly formed their intentions to use the system based on their normative beliefs. These users used the system when they believe that other people who are important to them expected them to use it. However, voluntary users formed their intentions to use the system mostly based on their attitude toward using the system. Therefore, in this study we argue the significant role of attitude in predicting the behavioural intention to use e-government services, due to the voluntary nature of using these services. In light of the above discussion, the original TAM, which includes the attitude construct, was chosen as a background theory for this study.

Limitations of TAM research

TAM is a technological deterministic model which means (that media technology shapes how we as individuals in a society think, feel, act, and how are society operates as we move from one technological age to another). The core variables of this model (perceived usefulness and perceived ease of use) are technology attributes. Therefore, the original TAM is criticised for ignoring the social influence on technology adoption (Fu et al., 2006; Mathieson, 1991). This might have been the motivation for Venkatesh and Davis (2000) to incorporate social constructs such as the subjective norms in their new version of TAM, which they referred to as TAM2. However, results of testing TAM2 showed that the effect of the subjective norm was only significant on intentions for mandatory, but not voluntary, usage settings (Venkatesh and Davis, 2000). This is possibly because this construct is difficult to be measured and be applied beyond the organisational context. Therefore, it can be argued that there is a need to incorporate other cultural and social constructs that are more suitable for voluntary usage settings such as citizen adoption of e-government services.

Furthermore, most of the prior TAM research is relatively focused on IT/IS adoption by employees in an organisational context (Phang et al., 2005), where the use, in most cases, was mandatory. Nevertheless, researchers need to be careful when applying the results of these studies to different contexts such as e-government, where the use of technology is voluntary. Therefore, these researches concentrate on the Citizens as the main population for this study, due the nature of electronic government as being voluntary technology.

Based upon the previous discussion on model of technology, TAM was the model used for technology acceptance in this thesis due to the following reasons:

- It's important attribute of being a generic model that can be applied to any context using ICT. Also it has received extensive support through validation, applications and replications for its power to predict use of information systems (Al-Shafi and Weerakkody, 2008; Cheng et al., 2006).

- TAM is considered to be a well-established, well-tested, powerful, robust and parsimonious model for predicting user acceptance of technology (Davis and Venkatesh, 1996; Davis et al., 1989; Holden and Karsh, 2010; Wilson and Lankton, 2007; Or and Karsh, 2009; Egea and González, 2011).

- The fact that various research and empirical studies used TAM in the context of e-government mainly to model users behaviour and intention to use certain e-government systems or applications as well as adding some constructs or variables that reflect trust as an example.

- The fact the TAM model contains variables (Attitude, perceived ease of use and perceived usefulness that were not included in the previous models.

2.8 Determinants of e-government adoption

Given that the government is the supplier of public service, and the public are "customers", Reddick (2005) classified the existing e-government literature into two streams of e-government adoption research: supply-side and demand-side. In this study the researcher further refined this classification of e-government adoption research.

On the one hand, the first stream studies e-government adoption from the supply-side perspective, which reflects factors that are important or related to the supplier of public services (local, state or national government) (Reddick, 2005). Thus far, this perspective explores factors that affect government organisations' adoption and implementation of e-government services (Ciborra and Navarra, 2005; Holden et al., 2003; Norris, 2003; Norris and Moon, 2005). Examples of these factors include IT infrastructure, financial resources, skilled personnel, and resistance to change.

On the other hand, the second stream studies e-government adoption from the demand-side perspective, which focuses on the "customers" of public services (Reddick, 2005). Prior research explored factors that influence citizens to adopt and use e-government services (Belanger and Carter, 2008; Carter and Belanger, 2005; Fu et al., 2006; Gilbert et. al, 2004; Phang et al., 2005). Examples of these factors include trust, culture, Perceived Usefulness, Perceived Ease of Use, and experience. This research will examine both problem adoption and barriers of implementation of e-government services.

2.9 E-government adoption and TAM

Despite the widespread use of TAM, few studies have explored factors that may influence G2C adoption of e-government using TAM as a background theory. The following **Table 2.3** and **Table 2.4** were organised to provide summarisation of the findings, including some statistical results related to the core variables of TAM (Perceived Usefulness and Perceived Ease of Use) and a set of external variables which were integrated to TAM. Conceptual but not empirical studies are shown by single asterisks (*).

Table 2.3: Findings related to the TAM core variables

TAM core Variables	Authors	Findings
Perceived Usefulness (PU)	Wangpipatwong et al. (2008)	Perceived usefulness was the strongest determinant of the citizen's continuance intention to use e-government websites. Path coefficient was 0.514, (*p* value < .001).
	Horst et al. (2007)	Perceived usefulness was the main predictor of citizen intention to use e-government services. Path coefficient was 0.426, (*p* value < .001)
	Kumar et al. (2007)*	The study hypothesised that citizen PU is a significant predictor of their intention (BI) to use e-government services.
	Fu et al. (2006)	PU was the strongest determinant and explained most of the variance of BI (R2 =0.40). Path coefficient was 0.63, (*p* value < .001)
	Chang et al. (2005)	PU was a significant determinant of attitude to use the e-tax service. Path coefficient was 0.74, (*p* value < .01)
	Phang et al. (2005)	PU was a significant determinant of BI to use the e-withdrawal service. Path coefficient was 0.65, (*p* value < .001)
	Carter and Belanger (2004a)	Citizen perception of PU was a significant predictor of their intention (BI) to use e-government services. Path coefficient was 0.192, (*p* value < .010)
	Wang (2003)	PU was a significant determinant of BI to use the e-tax service. Path coefficient was 0.14
	Warkentin et al. (2002)*	The study hypothesised that PU is a significant predictor of their intention (BI) to use e-government services.

Perceived ease of use (PEOU)	Wangpipatwong et al. (2008)	Citizen's higher perception of ease of use enhanced the level of the citizen's continuance intention to use e-government websites. Path coefficient was 0.188, (*p* value < .001).
	Kumar et al. (2007)*	The study hypothesised that citizen PEOU is a significant predictor of their intention (BI) to use e-government services.
	Fu et al. (2006)	PEOU had a direct effect on citizen BI to adopt e-tax. Path coefficient was 0.11, (*p* value < 001). PEOU explained a significant amount of the variance in PU. Path coefficient was 0.41, (*p* value < .001).
	Carter and Belanger (2005)	Increasing citizen perceptions of PEOU increases their BI to use e-government services. Path coefficient was 0.172
	Chang et al. (2005)	PEOU was a significant determinant of attitude to use the e-tax service. Path coefficient was 0.21, (*p* value < .01).
	Phang et al. (2005)	PEOU was a significant determinant of BI to use the e-withdrawal service. Path coefficient was 0.25, (*p* value < .01). PEOU was a significant determinant of PU. Path coefficient was 0.44, (*p* value < .001).
	Carter and Belanger (2004a)	PEOU did not have a direct effect on citizen BI to adopt e-government services
	Wang (2003)	PEOU was a significant determinant of BI to use the e-tax service. Path coefficient was 0.51. PEOU had a positive effect on PU. Path coefficient was 0.67.
	Warkentin et al. (2002)*	The study hypothesised that PEOU is a significant predictor of citizen intention (BI) to use e-government services.
Attitude toward Object	Chang et al. (2005)	Attitude toward e-tax system was a significant predictor of BI to use e-tax service. Path coefficient was 0.62.

Table 2.4: Findings related to the external variables to TAM

TAM External Variables	Authors	Findings
Trustworthiness	Carter and Belanger (2005)	Trustworthiness had a direct effect on BI to use e-government services. Path coefficient was 0.155, (*p* value < .010).
	Carter and Belanger (2004)	Trustworthiness did not have a direct effect on BI to use e-government services. Path coefficient was 0.619.
Trust	Horst et al. (2007)	Trust was the main determinant of the PU of e-government services. Path coefficient was 0.594, (*p* value < .001).
	Warkentin et al. (2002)*	They hypothesised that trust positively influence e-government adoption**.**
Culture	Warkentin et al. (2002)*	They hypothesised that the cultural demotions (power distance and uncertainty avoidance) were most likely associated with e-government adoption.
Relative advantage	Carter and Belanger (2005)	Relative advantage was not a significant determinant of citizen BI to adopt e-government services (*p* value = .111).
	Carter and Belanger (2004a)	Relative advantage was a significant determinant of citizen BI to adopt e-government services. Path coefficient was 0.167, (*p* value < .05)**.**
Compatibility	Fu et al. (2006)	Compatibility was a significant determinant of PU and PEOU. (*p* value < .001).
	Carter and Belanger (2005, 2004a)	Compatibility was a significant determinant of citizen BI to adopt e-government services. (*p* value < .001).
	Phang et al. (2005)	Compatibility was not a significant determinant of citizen BI to adopt e-withdrawal services.
Image	Carter and Belanger (2005, 2004a)	Image was not a significant determinant of citizen BI to adopt e-government services.
	Phang et al. (2005)	Image was not significant determinant of citizen BI to adopt e-Withdrawal service.
Perceived risk (PR)	Horst et al. (2007)	Risk perception found to be significantly predicting the perceived usefulness. Path coefficients was -0.527 (*p* value < .001).
	Kumar et al. (2007)*	The study hypothesised that lower level of PR positively influences e-government adoption rates.
	Fu et al. (2006)	PR did not have effect on citizen BI to adopt e-tax.
	Warkentin et al. (2002)*	The study hypothesised that perceived risk negatively influences intentions to engage in e-government.
Perceived control(PC)	Horst et al. (2007)	PC found to be significantly predicting the perceived usefulness. (p value < .001).
	Kumar et al. (2007)*	The study hypothesised that a higher level of PC positively influences the e-government adoption rates.
Information quality (IQ)	Chang et al. (2005)	IQ found to positively influence PU. Path coefficient was 0.28 (p value < .05). IQ found to marginally

		influence PEOU. Path coefficient was 0.08 (p value < 0.1).
Perceived relative benefits (avoid personal interaction, cost, time)	Gilbert et al. (2004)	All factors except the factor "avoid personal interaction" were correlated with the intention to use e-government services. p values were (0.061, 0.014, 0.001, 0.000) respectively.
Perceived barriers (experience, information quality, financial security, low stress, trust and visual appeal)	Gilbert et al. (2004)	All factors significantly associated with a willingness to use e-government services. p values were (0.002, 0.021, 0.001, 0.033, 0.000, and 0.042) respectively.

As summary, the factors that had been used in the research model from the previous tables will be explained in detail in the next chapter.

2.10 Summary

This chapter presented the state of the art in e-government research by reviewing the key issues related to concepts, definitions, and perceptions. These issues were explained by identifying the main characteristics and various perspectives, and their interaction necessary when embracing e-government. The interdisciplinary nature, multiple definitions and meanings reflected the complexity existing in e-government.

The literature reviewed in this chapter has helped to develop a better understanding of the challenges impeding successful e-government implementation, as well as addressing the many opportunities provided to improve government efficiency and effectiveness. The literature review focussed principally on these issues in both developed and developing countries, in particular the Arab World and Africa. The review emphasised the relative lack of research dedicated to developing countries.

The investigation of e-government adoption models addressing critical factors of adoption highlighted many factors such as trust, culture, public value and website

design. The literature review also showed the low level of e-government adoption from both supply and demand-side perspectives.

As a result of analysing different models and determinants, TAM was chosen and the following factors were chosen to be added to it (Website design, Trust, and perceived public value).

The next chapter discusses the constructs underlying the questionnaire in details, the reasons for using these variables and not using others external variables from the previous researches and the development of the proposed research TAM extension model with the added factors of trust in internet, trust in government, website design and perceived public value. The next chapter also discusses the hypotheses established used to test the relationships in the model.

3. Research Model and Hypotheses

3.1. Introduction

The previous chapter presented and discussed the technology acceptance models and theories widely used in the IT domain and ended with a summary of the TAM technology acceptance model adopted for this research. **This chapter** presents the research model proposed and investigated in this study to affect adoption of e-government services. The research model integrates the TAM framework factors along with a set of other important factors identified in the literature that are considered to be the most relevant to e-government adoption. These include: trust in government, trust in internet, perceived public value, and national website design and demographic factors. The rationale for the relationships in the research model and the justification for the research hypotheses are also discussed. Chapter outline is presented in the following diagram

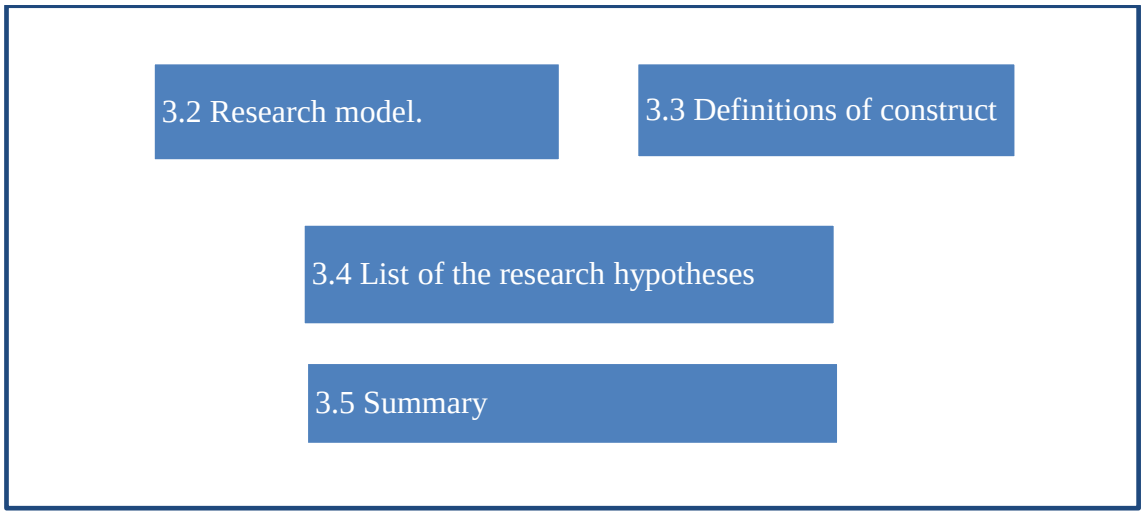


Figure 3.1: Chapter outline

3.2. Research model

The new model for adoption of e-government created and tested in this research is based on the following adoption factors from the original TAM model together with other adoption factors from the aforementioned literature in the domain of e-government and e-participation. From the TAM model 4 factors: Perceived Usefulness, Perceived Ease of Use, Attitude, and Behavioural Intention were used. Added to TAM were 7 external variables: Trust in Internet, Trust in Government, Website Design, Perceived Public value, Age, Gender and Education level. There were others external variables, used in other researches as shown in **chapter 2** (**Table 2.5**), which were not included in the model for example: "Relative advantage" variable which is from Diffusion of Innovation (DOI) theory similar to "Perceived Usefulness" in TAM model (Venkatesh et al (2003); "Compatibility Construct" which is also from Diffusion of Innovation (DOI) theory and is included in "Perceived Public Value" variable and "Attitude" in TAM; "Image variable" which is from Theory of Reasoned Action (TRA) (refers to one's perception of innovation as status symbol) is not applicable and it has been proven that it has no effect on the adoption of e-government Phang et al. (2005); "Perceived control" and "Perceived Risk" (refer to the risk of exposing and losing personal information through online interaction variable) are combined in "Trust in Internet" variable.

This study proposes the model that posits that a citizen's actual use of e-government services is measured by citizen behavioural intention to use e-government information and services within the research model, which is similar to what TAM advocates. Also in alignment with TAM, Behavioural intention is affected by attitude towards using e-government and perceived usefulness. Attitude is affected by the two beliefs perceived usefulness and perceived ease of use. This constitutes the original TAM model. Both beliefs are then proposed to be affected by the external variables/constructs - age,

gender, education level, trust in government, and trust in the internet, perceived public value, and website design. These external variables are the added factors/constructs to the original TAM model, derived from previous literature to be investigated in this research for their effect on e-government adoption.

The following subsections provide descriptions of each construct, along with the theoretical justification for including them in the research model and the associated hypotheses. **Figure 3.2** below proposes the research model for e-government adoption in an Egypt context that investigates the adoption rate and citizens' behaviour regarding e-government services, whether adopters or non-adopters, which will both be investigated in this research.

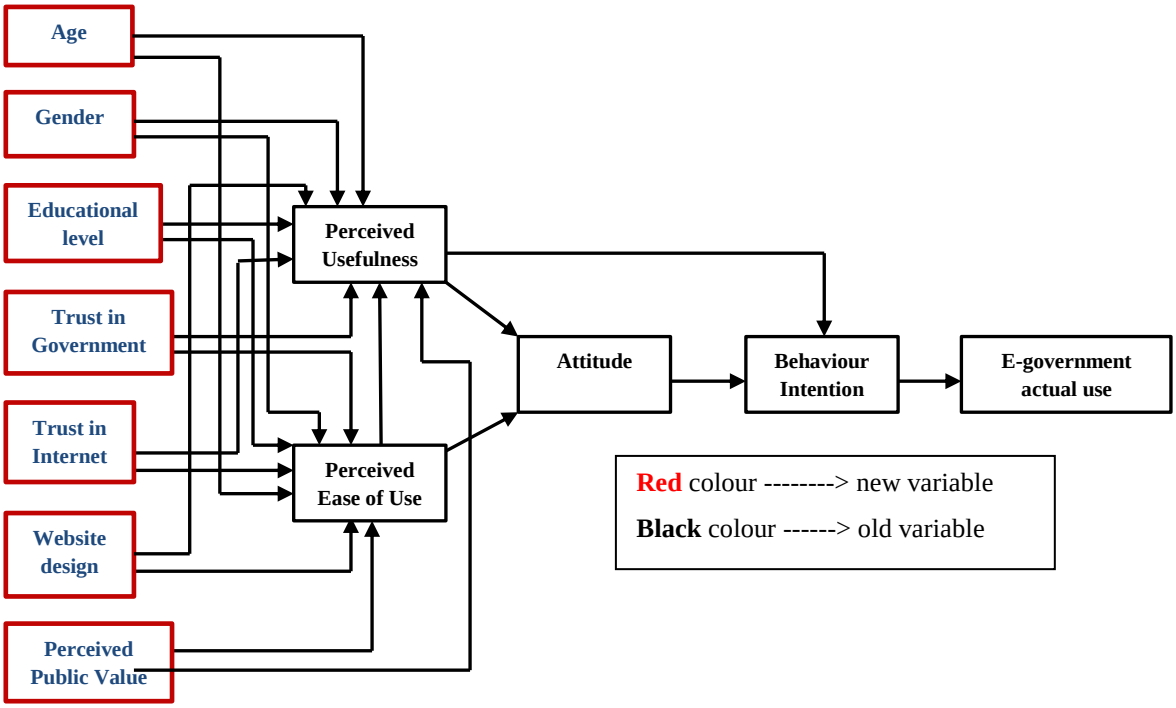


Figure 3.2: Proposing new model with new variables

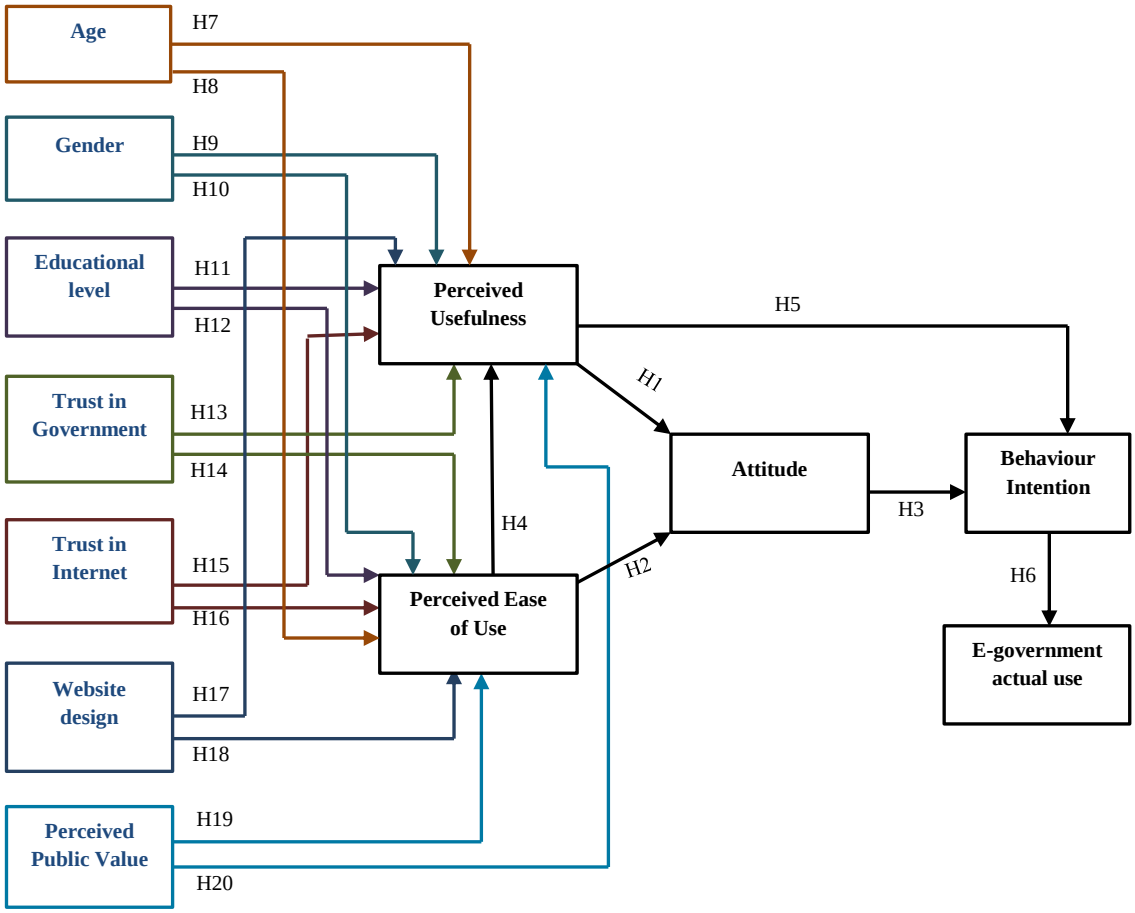


Figure 3.3: E-government Adoption Research Model

Furthermore the hypothesised relationships between the independent constructs and the dependent constructs to be tested in this study are explained in the next section and illustrated in **Figure 3.3** above

3.2.1. Hypotheses related to TAM's variables

Based on the assumptions of the original TAM, the following hypotheses are proposed:

***H1**: There is a direct and positive relationship between Perceived Usefulness (PU) and Attitude (ATT) towards using e-government services.*

Perceived usefulness in the TAM model originally referred to job related productivity, performance, and effectiveness (Davis, 1989). This is an important belief providing insight into how user attitudes toward using (and intention to use) are influenced.. Perceived usefulness was found to be significant constructs in the e-Government

adoption literature (e.g. Carter & Belanger, 2004, 2005). Fu et al. (2006) and Norazah et al. (2008) found that behavioural intention was largely driven by perceived usefulness. Due to the above indications this research will test and measure the strength of any existing association/relationship between perceived usefulness and attitude"

***H2**: There is a direct and positive relationship between Perceived Ease of Use (PEOU) and Attitude (ATT) towards using e-government services.*
***H4**: There is a direct and positive relationship between Perceived Ease of Use (PEOU) and Perceived Usefulness (PU) of e-government services*

Perceived ease of use is another major determinant of attitude toward use in the TAM model. This internal belief ties to an individual's assessment of the mental effort involved in using a system (Davis, 1989). Perceived usefulness and perceived ease of use are distinct but related constructs. Improvements in perceived ease of use may contribute to improved performance. Davis (1989) had proposed to test the generality of the observed usefulness and ease of use trade off and to assess the impact of external interventions on these internal behavioural determinants. The empirical research findings were however mixed (Chau, 1996; Davis, 1989). Perceived ease of use was found to be a significant construct in the e-Government adoption literature (e.g. Carter & Belanger, 2004, 2005). Wang (2002) found that perceived ease of use was a stronger predictor of people's intention to e-file than perceived usefulness. Due to the above indications this research will test and measure the strength of any existing association/relationship between perceived ease of use and attitude. As a summary: Information systems that users perceive easier to use and less complex will increase the likelihood of its adoption and usage (Teo et al. 1999). According to several researches on TAM (Davis et al. 1989; Teo et al. 1999), PEOU has been shown to influence behaviour (i.e., IT adoption) through two causal ways: (1) an indirect effect on behaviour via ATT and (2) an indirect effect on behaviour via PU. Therefore this study proposes H2 and H4.

***H3**: There is a direct and positive relationship between Attitude (ATT) towards e-government and Behaviour Intention (BI) to using e-government services.*

Attitude has long been identified as a cause of intention. Psychologists have discussed the theoretical construct of attitude for decades. Generally Attitude in Fishbein and Ajzen's (1975) paradigm is classified into two constructs: attitude toward the object and attitude toward the behaviour (which is used in this research). The latter refers to a person's evaluation of a specified behaviour. This evaluation of a specified behaviour leads to certain behavioural intention that further results in certain behavioural action. Adapting this general principle, **attitude toward use** in the TAM model is defined as the mediating affective response between usefulness and ease of use beliefs and intentions to use a target system. In other words, a prospective user's overall attitude toward using a given system voluntarily is an antecedent to intentions to adopt (Davis, 1989).

In user participation research, it is also believed that, prior to system development, users are likely to have vaguely formed beliefs and attitudes concerning the system developed (Hartwick & Barki, 1994). For the same reason, in consumer research, attitude is the construct that receives most attention and is used most widely for predicting consumers' likelihood to adopt a new technology (Erevelles, 1998). Pragmatically, consumers today have been exposed to a number of technology innovations. They are likely to have formed a favourable or unfavourable attitude about them irrespective of whether they have actually used the product in question. As an innovative system, e-Government is still in its infancy.

Large numbers of users simply do not exist in many countries and regions. An investigation of attitudes toward using e-Government and identification of its relationship with intention to use is more appropriate and practically valuable for

predicting usage behaviour. Due to the above indications this research will test and measure the strength of any existing association/relationship between attitude and intention

> ***H5**: There is a direct and positive relationship between Perceived Usefulness (PU) and Behaviour intention (BI) to use e-government services.*

According to Davis (1989), Customer's intention to adopt and make use of a certain technology depends not only on the attitude but also on how the customers believe that using e-government would provide all required information – i.e. usefulness. Fu et al. (2006) and Norazah et al. (2008) found that behavioural intention was largely driven by perceived usefulness. Due to the above indications this research will test and measure the strength of any existing association/relationship between perceived usefulness and behaviour intention

> ***H6**: There is a direct and positive relationship between Behaviour intention (BI) to use e-government services and E-government actual use.*

Behavioural intention is defined as a customer's intention to adopt and make use of a certain technology in the future (Ajzen, 1991; Taylor and Todd, 1995; Venkatesh et al., 2003). According to Irani et al., (2009), the majority of technology adoption researchers have utilised behaviour intention to predict technology adoption. Also, Ajzen (1991) suggests that behavioural intention is counted to have a direct influence on adoption. The measurement of behavioural intention includes the intention, and predicted use of e-government services.

As summary despite these relationships (H1-H6) haves been tested and proven before, this research is endeavouring to test their strength statistically, which has not been done previously.

3.2.2. TAM extension

As mentioned earlier, this study extends the original TAM by integrating the original TAM constructs with the new constructs: trust in government, trust in the internet, website design, perceived public value, and demographic variables (age-gender-education level) to test how this new adjusted model of factors influences citizen adoption of e-government services. The following sections provide a review of the literature on the external variables that have been integrated with the TAM model and why they have been added to the model. The research hypotheses, which have been developed based on the existing literature will also be presented.

Hypotheses from H9 to H20 were based on TAM model assumptions, that all external variables should be added to the model through users beliefs (perceived usefulness and perceived ease of use) to test their direct relationships with them (Davis et al., 1989). As explained before in **chapter two section (2.7.4)**, any other combinations of adding the variables internally within the TAM model to test for other direct relationship hypotheses was outside the scope of this research. While the sections below show other researchers testing the importance of each of the 7 individual constructs, NO research has combined them all together before to test the overall GOODNESS OF FIT of the entire model using all these variables/constructs collectively. Also this research will statistically measure the strength of each relationship between the constructs, which also hasn't been identified before.

Trust in the Internet

Trust is emerging as a potentially important factor leading to IT acceptance. Given the uncertain environment of the Internet, trust is theorised as a direct determinant of behavioural intentions (Al-adawi et al., 2005). It is especially required in the case of sourcing customers and later attracting them to return to online shopping (Gefen, 2002). Trust is considered as one of the main factors that affect customer engagement and participation in e-commerce transactions (Jarvenpaa and Tractinsky, 1999; Rose et al., 1999, Stewart, et al. 2002, Pavlou 2003). It plays a critical role in motivating consumers to purchase through the Internet (Jarvenpaa and Tractinsky, 1999). Gefen et al. (2003) integrated TAM with trust to study their effects on consumer decisions to return to an e-vendor.

The results showed that trust is related to purchase intention. Lee et al. (2006) studied the role of trust in virtual communities to better understand the activities of ecommerce. They found that trust is one of the key variables in explaining user acceptance of virtual communities. Cho et al. (2007) also explored the role of trust in mobile commerce adoption. The results indicated that trust is an important factor affecting the intention to use mobile commerce.

In their model, Jarvenpaa et al. (2000) identified two main antecedents of trust in online shopping: perceived merchant reputation, and merchant size. The differences in reputation and size among Internet stores influence the consumer assessment of trustworthiness.

Trust issues are categorised as trust in the Internet in terms of security and privacy, and trust in government (which both are tested in this model). Carter and Belanger (2005) emphasise that "citizens must have confidence in both the government and the enabling technologies".

Trust in the Internet is often identified as institution-based trust (Carter and Belanger, 2005; Belanger and Carter, 2008), which is "the belief that needed structural conditions are present (e.g. in the internet) to enhance the probability of achieving a successful outcome in an endeavour like e-commerce" (McKnight et al., 2002).

Egypt is a developing country that faces the challenge of establishing a legal framework to govern the utilisation of information communication technologies (ICT), regarding issues such as consumer protection, cybercrimes and privacy (MCIT, 2013). Thus, Egyptian citizens may be concerned about the privacy and security of their information, even when dealing with government agencies via the Internet. Prior research has extensively recognised trust in the Internet as a significant predictor of e-government services adoption (Carter and Belanger, 2005; Chang et al., 2005) and this research recognises its importance.

In the developed countries, Carter and Belanger (2005) examined the significant role of trust in citizens' intention to use e-government websites by designing a model for e-government adoption that examined the factors that influence citizens' adoption of e-government initiatives. The model integrated the constructs from the TAM, Diffusion of Innovation Theory, and Web Trust Model. By Collecting 105 questionnaires from citizens at a community concert who had different levels of computer and internet expertise, Carter and Belanger (2005) argued that trust in the internet and trust in government are significant factors that affect citizens' intention to use e-government services.

With regard to developing countries, Chang et al. (2005) and Phang et al. (2005) have provided two empirical studies based on the TAM in Taiwan and Singapore, respectively. The two authors found that trust in the Internet (security and privacy) influences intention to use e-government services. These indicate the indirect and intermediate influence of trust in the Internet (security and privacy) on citizens' intention to use e-government services in two developing countries. The current study at hand explored the role of trust in the Internet (security and privacy) in e-government adoption by testing the direct relationship between the two constructs. This will be done through data collection methods and statistical analysis techniques explained in the subsequent chapter.

It also focused on the adoption of e-government websites in general without focusing on a specific service. These arguments informed the following 2 hypotheses:

H15: There is direct and positive relationship between Trust in the Internet (TI) and Perceived Usefulness (PU).

H16: There is direct and positive relationship between Trust in the Internet (TI) and Perceived Ease Of Use (PEOU).

Trust in government

"Trust in government" can be defined as the public's assessment of government based on their perceptions of political authorities', agencies' and institutions' integrity and capability to provide services according to the expectations held by the citizens (Belanger and Carter, 2008). The government in Egypt displays a lack of collaboration between its entities in drafting laws and regulations related to ICT usage, standardisation of the system's use, and sharing of information (MCIT, 2004).

These issues may cause the government in Egypt to deliver its services and information inefficiently. Thus, Egyptian citizens may be suspicious of the government's capability to implement e-government systems with the full features that would meet their expectations, such as an efficient and secure transaction processes. This study therefore explores the influence of citizens' trust in government on their intention to utilise e-government services in Egypt. This will be done through data collection methods and statistical analysis techniques explained in the subsequent chapter.

Belanger and Carter (2008) provided empirical evidence by examining the influence of trust in government over e-government adoption in the USA They found that trust in government is a significant factor influencing citizens' intention to use e-government.

However, there is a lack of research examining the influence of trust in government on e-government adoption in developing countries, such as Egypt. As a result of the above discussion this research investigates whether the following hypotheses are correct regarding adoption of e-government in Egypt.

H13: There is direct and positive relationship between Trust in the Government (TG) and Perceived Usefulness (PU).

H14: There is direct and positive relationship between Trust in the Government (TG) and Perceived Ease of Use (PEOU).

Perceived Public value

The value concept has been frequently used in different literatures, such as economics, marketing, accounting, finance, strategy, production, and management (Woodall, 2003). Value perception is a widely used concept when it comes to marketing (Woodruff and Gardial, 1996). It can be applied to many different settings in an organisation, be it financial, or strategic.

Woodall (2003) noted the term 'consumer value' is used within the literature to describe both what is obtained by the consumer from the supplier, and also what is obtained by the supplier from the consumer. Woodall noted that what is obtained by the supplier from the consumer is generally known as 'consumer lifetime value', but there is no agreement on what is obtained by the consumer from the supplier. Woodall (2003) found eighteen different names for similarly described, demand-side notions of consumer value. The most commonly used appendages were 'consumer value', 'perceived value', 'value' and 'consumer perceived value'.

Integrating various definitions of value into a single definition, Zeithaml (1988) proposed "perceived value is the consumer's overall assessment of the utility of a product based on the perceptions of what is received, and what is given". Thus perceived value is a subjective evaluation of the trade-off between all that is received, and all that is given up in the process of acquiring, or using a consumption related object (product, store, service) (Dodds et al., 1991; Woodall, 2003). Despite this view, a number of studies have expanded upon Zeithaml's (1988) third definition

by conceptualising and/or examining perceived value as quality for the money (Sweeney et al., 1999).

More attention has been paid recently to perceived value as a stable construct to predict buying behaviour. Indeed, customers' value perceptions have been found to influence customer behavioural intentions. It increases their willingness to buy a product or use a service, and decreases their intentions to trying to find an alternative (Pura, 2005). Among the perceived value dimensions, a study by Pura (2005), found that only conditional value, monetary value, and convenience value have a positive effect on behavioural intentions.

A number of researchers have explored the role of perceived benefits on IT adoption (Chwelos et al., 2001; Moore and Benbasat 1996; Poon and Swatman, 1995). Moore and Benbasat (1996) found that perceived benefits are one of the most influential determinants of technology usage. Poon and Swatman (1995) concluded that a perceived benefit is one of the key reasons for the internet adoption by organisations. Chwelos et al. (2001) also found that higher perceived benefits would lead to more intention to adopt Electronic Data Interchange

According to Kelly et al. (2002), public value refers to ''the value created by government through services, laws regulation and other actions''. It is a way of capturing all the dimensions of government performance to assure its relevance to the stakeholders (Kelly et al., 2002). In e-government, the stakeholders include citizens, businesses, other governments and government employees (Seifert, 2003). Chatfield and Alhujran (2007) explained the public value concept as follows: ''public value is predicated on these stakeholders' preferences, because only the stakeholders - not the government, can determine what is truly of value to them. However, public value is also predicated on the new capability of e-government to

understand the different stakeholders' needs and provide services they value, thereby creating public value that justifies and legitimises the sustained government spending on e-government.

In other words, the legitimacy of e-government as a whole largely depends on how well it creates public value, by producing the outcomes, services and trust that are aligned with e-government strategic objectives. Although it is a significant challenge for government agencies, citizens expect to get improved government information and services, public governance, transparency, and accountability through e-government services provision (Grimsley and Meehan, 2007)

Although they have not used the term perceived public value (PPV), Gilbert et al. (2004) found that citizen willingness to use e-government services is increased if they perceived that the electronic delivery of public services is saving their money and time (creating value for them). Saving citizens' time and money is a subset of the perceived public value concept. These values (saving time, providing better value for money and increases the government transparency) will be used in the data collection methods in this study.

In addition, one of the major benefits of the e-government, is that it enhances the accessibility and convenience of government services and information to citizens (Carter and Belanger 2004b), and therefore, it can be argued that PPV is likely to be an important factor in predicting e-government adoption. Thus, the previous arguments lead to the following hypotheses to be investigated in context of Egyptian e-government adoption in this research:

***H20**: There is direct and positive relationship between Perceived public value (PPV) and the Perceived Usefulness (PU) of e-government services.*

***H19**: There is direct and positive relationship between Perceived public value (PPV) and the Perceived Ease of Use (PEOU) of e-government services.*

Website design

As e-government websites have become the main channel for online interaction between the government and citizens', designing user-centred websites has become a concern of governments (Becker, 2004). Bertot and Jaeger (2006) argue that accessibility is one of the most important considerations in building useful user-centred e-government services.

Studies demonstrate the importance of well-presented content on government websites in ensuring citizens' satisfaction with the services provided (Smith, 2001; Wang et al., 2005; Zhang and von Dran, 2000). Wang and colleagues (2005) state that without appropriate evaluation of web-based e-government services, some of the e-government benefits, such as fast access to government services and cost reduction, cannot be assured.

In an empirical evaluation of the influence of website design on e-government adoption, Gilbert and Balestrini (2004) conducted a study in the UK to examine the main predictors of individuals' willingness to use government e-services. Visual appeal emerged as a significant factor that influenced citizens' willingness to use government e-services.

Abanumy et al. (2005) explored the importance of web usability and accessibility with respect to e-government websites in two Arabic countries, Saudi Arabia and Oman. They used an email survey to explore the reasons behind the lack of accessibility/usability of e-government websites. The authors found that lack of awareness of the importance of websites' accessibility and unavailability of the accessibility policy was the main reasons behind the inaccessible websites. In general, they found that the government websites still needed considerable work in order to become accessible websites to the public.

This research embraced the idea that it is necessary to investigate the influence of government website design on citizens' intention to adopt e-government websites in order to ensure successful employment of e-government. As evidenced above, there is a clear lack of studies that empirically examine the direct relationship between website design and technology usage and, in particular, e-government. Therefore, this study investigates the following hypotheses to determine whether website design influences e-government adoption in Egypt:

H18: There is direct and positive relationship between Website design (WD) and Perceived Ease of Use (PEOU).

H17: There is direct and positive relationship between Website design (WD)and Perceived Usefulness (PU).

Age

Older individuals tend to perceive a reduction in their own cognitive capabilities to learn (Hertzog and Hultsch, 2000) and have lower perceptions of self-efficacy with regard to cognitive functioning (Bandura, 1997). Thus, since many older individuals have limited experience using computers and the Internet, it is likely that they have self-efficacy concerns related to learning how to use services offered online. Similarly, older individuals tend to have self-referent beliefs about perceived changes related their performance capabilities due to aging.

According to Hertzog and Hultsch (2000), these metacognitive beliefs can affect an older individual's decision to "engage in or avoid cognitively demanding situations." Thus, since many older individuals have limited experience using computers and the Internet, it is likely that learning to use the Internet creates an anxiety-provoking situation that many would choose to avoid because of perceived difficulty associated with the task.

Therefore, this study investigates the following hypotheses to determine whether Age influences users beliefs (Perceived usefulness and perceived ease of use).

H8. Age is negatively associated with perceived ease of use of e-government service website (PEOU).

H7. Perceived usefulness (PU) associated with the Internet is lower for individuals who are older.

Gender

Gender, a fundamental sociocultural factor, can influence people's perceptions and behaviours significantly (Gefen and Straub, 1997). In general, men are encouraged to be assertive and competitive, and women to be nurturing and cooperative; such differential gender roles are often transferred through socialisation (Gefen and Straub, 1997). Gender might play a role in determining person's frame of reference in evaluating a technology; e.g., usefulness or ease of use. Some empirical evidence suggests perceived usefulness is more significant for men than for women (Venkatesh and Morris, 2000). The social roles and expectations for women seem rigid in the Arabian culture (Al-Gahtani et al., 2007); for example, women in Saudi Arabia are expected to act in accordance with strict social norms and expectations. An individual's opinions or judgments may be suppressed or even bow to social influences. Along this reasoning, the following hypothesis is presented:

H9. Perceived usefulness (PU) is more salient for men than for women

Prior research has shown the influence of effort expectancy on technology acceptance to be more salient for females than males (Venkatesh and Morris, 2000; Venkatesh et al., 2003). Several previous studies report that male students generally seem more comfortable learning and experimenting with IT than female students; e.g., Venkatesh and Morris (2000) commented that women tend to place more importance on service aspects than do men. In this light, female workers may be more appreciative of the ease of use of computer technology than their male counter parts; therefore this research tests the following hypothesis

H10. Perceived ease of use (PEOU) is more important to women than men

Education

The decision to adopt a new technology is related to the amount of knowledge one has regarding how to use that technology appropriately, and complex technologies, such as the e-government, require more knowledge (Rogers, 1995). Early adopters of new technologies tend to have higher educational levels, perhaps reflecting their ability to understand "how-to" knowledge more quickly than those with less education (Rogers, 1995). Empirically, less educated individuals report insufficient knowledge as one of the main reasons that they choose not to use the Internet (NTIA, 2002). They feel more computer anxiety and have less sophisticated cognitive structures that impede their ability to learn in new environments (Hilgard and Bower, 1975).

Also adopters with high education level tend to understand the usefulness of using the services offered by the government online (Al-Ghaith et al (2010). Furthermore, empirical studies also show a significant positive relationship between education level and perceived ease of use and between education level and perceived ease of use (Agarwal and Prasad, 1999). Hence the need to investigate the strength of the correlation of the following

H11. Perceived Usefulness (PU) associated with the Internet is lower for individuals who are less educated.

H12. Perceived ease of use (PEOU) associated with the Internet is lower for individuals who are less educated.

3.3. Definitions of constructs

The research model has eight constructs leading to e-government actual use; the definitions for these constructs are summarised in **Table 3.1**. This is in addition to 3 demographic constructs.

Table 3.1: Model constructs definitions

Construct	Definitions	Reference
Perceived Usefulness	*The degree to which a person believes that using a particular system would provide all the required information.*	Davis (1989)
Perceived Ease of Use	*The degree to which a person believes that using a particular system would be free of mental effort*	Davis (1989)
Attitude	*An individual's positive or negative feelings (evaluative affect) about performing the target behaviour*	Fishbein Ajzen, (1975)
Behavioural Intention to Use	*Strength of one's intention to perform a specified behaviour (towards innovation)*	Fishbein Ajzen, (1975); Carter and Belanger, (2005)
E-government Actual use	*The actual use and associated behaviour of the innovation*	Venkatesh et al., (2003); Davis (1989)
Trust in the Internet	*The belief that needed structural conditions are present (e.g. in the internet) to enhance the probability of achieving a successful outcome in an endeavour like e-commerce"*	Al-Sobhi et al. (2009), Sang et al (2010)
Trust in Government	*The public's assessment of government based on their perceptions of political authorities', agencies' and institutions' integrity and capability to provide services according to the expectations held by the citizens*	Belanger and Carter, 2008)
Perceived Public Value	*Public value refers to the value created by government through services, laws regulation and other actions.*	Kelly et al. (2002, p.4)
Website design	*Finding technical solutions to manage both the structural and the presentational elements of a site*.	Zhang and von Dran,2000)
Gender	*Hierarchical separation between women and men embedded in both social institution and social practices*	Venkatesh et al., (2003);
Age	*Different age categories of the adoption of innovation*	Dwivedi and Lal, (2007);
Education level	*Different demographic education level between citizens*	Dwivedi and Lal, (2007); Venkatesh et al., (2003);

3.4. List of the research hypotheses

The following is a list of all the research hypotheses that have been developed based on the literature review and the assumptions of TAM. These hypotheses are tested using Structural Equation Modelling (will be explained in **chapter 5** in this study to empirically validate the proposed research model (**Figure 3.1**) of e-government adoption in Egypt.

Hypothesis 1

- H1: There is a direct and positive relationship between PU and Attitude towards using e-government services.

Hypothesis 2

- H2: There is a direct and positive relationship between PEOU and Attitude towards using e-government services.

Hypothesis 3

- H3: There is a direct and positive relationship between Attitudes in e-government website towards behaviour intention.

Hypothesis 4

- H4: There is a direct and positive relationship between PEOU and PU of e government services.

Hypothesis 5

- H5: There is a direct and positive relationship between Perceived Usefulness and Behaviour intention to use e-government services.

Hypothesis 6

- H6: There is a direct and positive relationship between Behaviour intention to use e-government services and E-government actual use.

Hypothesis 7

- H7. Perceived usefulness associated with the Internet is lower for individuals who are older.

Hypothesis 8

- H8. Age is negatively associated with perceived ease of use of e-government service website.

Hypothesis 9

- H9. Perceived usefulness more salient for men than for women.

Hypothesis 10

- H10. Perceived ease of use is more important to women than men

Hypothesis 11

- H11. Perceived Usefulness associated with the Internet is lower for individuals who are less educated.

Hypothesis 12

- H12. Perceived ease of use associated with the Internet is lower for individuals who are less educated.

Hypothesis 13

- H13: There is direct and positive relationship between Trust in the Government and PU.

Hypothesis 14

- H14: There is direct and positive relationship between Trust in the Government and PEOU.

Hypothesis 15

- H15: There is direct and positive relationship between Trust in the Internet and PU.

Hypothesis 16

- H16: There is direct and positive relationship between Trust in the Internet and PEOU.

Hypothesis 17

- H17: There is direct and positive relationship between Website design and PU.

Hypothesis 18

- H18: There is direct and positive relationship between Website design and PEOU.

Hypothesis 19

- H19: There is direct and positive relationship between Perceived public value and the PEOU of e-government services.

Hypothesis 20

- H20: There is direct and positive relationship between Perceived public value and the PU of e-government services.

3.5. Summary

An integrative research model grounded in the technology acceptance model (TAM) has been introduced in this chapter as the basis for this study (refer to **Figure 3.1**). The set of empirically testable hypotheses testing the proposed relationships in the model were then presented and discussed. The external variables hypotheses from H9 to H20 were based on TAM model assumptions, that all external variables should be added to the model through users beliefs (perceived usefulness and perceived ease of use) to test their direct relationships with them. While the literature shows other researchers testing the importance of each of the 7 individual constructs, NO research has combined them all together before to test the overall GOODNESS OF FIT of the model using all these variables/constructs collectively. The next Chapter will discuss the methods used to conduct this research (quantitative method for the survey for both e-government adopters and non-adopters, and qualitative method for the interviews with Egyptian government and Egyptian citizens).

4. Research Methods Implementation

4.1 Introduction

This chapter addresses important choices, resources and information regarding research design principles. There are several options in terms of research approaches and techniques that can be used in the research design. The choices made in methods for this study are related to the research aim: to identify the critical factors, in order to develop an appropriate e-government adoption model for Egypt.

This study follows what Creswell (2008) defines as "sequential procedures, in which the researcher seeks to elaborate on or expand the findings of one method with another method". Creswell states that "the study may begin with a quantitative method in which theories or concepts are tested, to be followed by a qualitative method involving detailed exploration of a few cases individuals," which is the strategy employed within this research as explained henceforth.

The following sections describe the different research approaches, paradigm, methods, data collection and analysis techniques used to investigate the presence of such impact of social factors on e-government adoption in Egypt. Chapter outline is illustrated in **Figure 4.1**

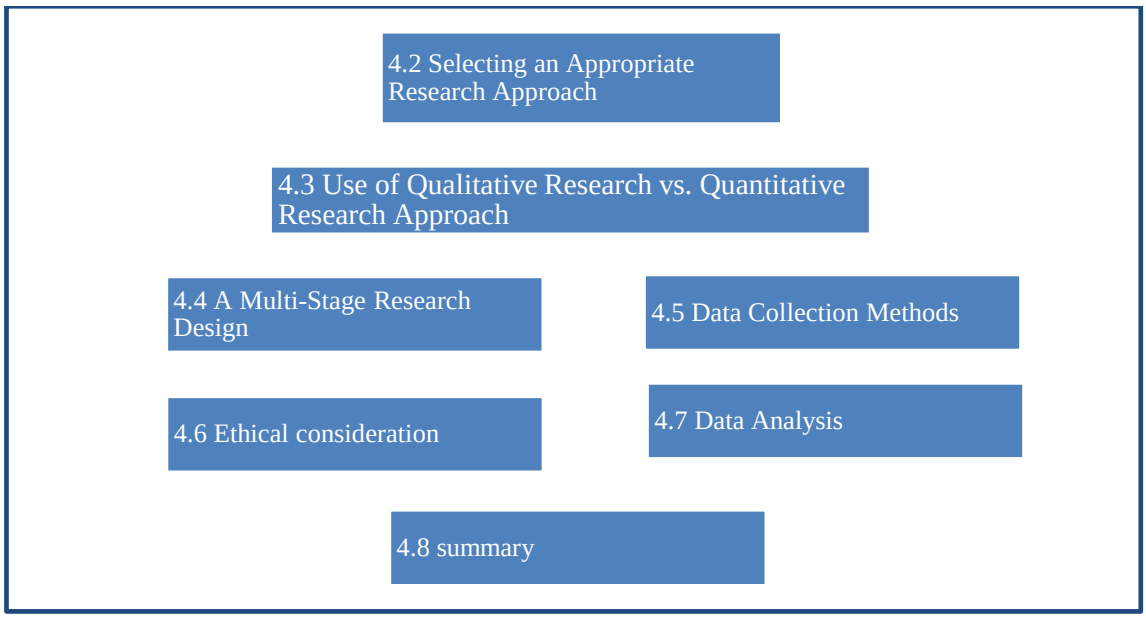


Figure 4.1: chapter outline

4.2 Selecting an Appropriate Research Approach

The selection of an appropriate research approach to study Information Systems (IS) related phenomenon is not an easy task (Galliers, 1994). IS are not related to a single theoretical perspective (Orlikowski and Baroudi, 1991), and therefore, researchers are able to choose a suitable method from plenty of research approaches and strategies, IS having several philosophical approaches, including positivism, interpretive, and critical (see **Figure 4.2**). These concentrate on different approaches to research, and on an enquiry into the nature of knowledge.

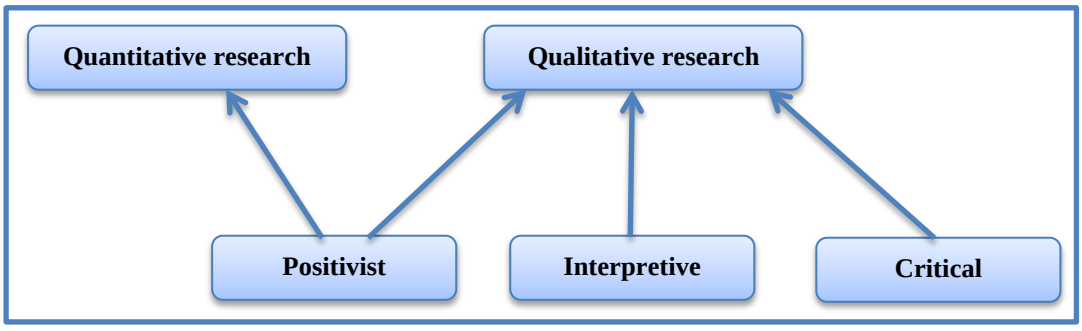


Figure 4.2: Epistemological Assumption for Qualitative and Quantitative Research (Source: Adapted from Straub et al., 2005)

Orlikowski and Baroudi (1991), Irani et al., (1999) and Straub et al., (2005) all specify that information systems are not covered in one theoretical perspective. There are many

different views about these phenomena suggesting three categories based on the fundamental research epistemology; positivist, interpretive, and critical approaches (see **Figure 4.2**). Furthermore, in previous IS studies, the positivism approach (which is used in this research and the reason is shown in **Table 4.1**) has been the prime epistemology in IS research (Yin, 2003; 2009; Straub et al., 2004; Walsham, 1995; Galliers, 1992). The following **Table 4.1** shows the summary of epistemological stances between the different specified approaches.

Table 4.1: Summary of Epistemological Stances

Approach	Description	References
Positivist	Positivist studies generally attempt to test theory, in an attempt to increase the predictive understanding of phenomena. Several researchers classified IS research as positivist if there was evidence of formal propositions, quantifiable measures of variables, hypothesis testing, and the drawing of inferences about a phenomenon from the sample for a stated population.	Orlikowski and Baroudi (1991); Straub et al., (2004: 2005)
Interpretive	Interpretive studies generally attempt to understand phenomena through the meanings that people assign to them. They are aimed at producing an understanding of the context of the information system, and the process whereby the information system influences and is influenced by the context'.	Walsham (1995)

Tashakkori and Creswell (2007), specify that the research integrates findings, and draws inferences using both quantitative and qualitative methods in a single study. Furthermore, researchers have been employing more than two methods, for example, surveys, observations and interviews in multi-method research (Fidel, 2008). Bernardi et al., (2007) employed three instruments for their study and analysis that include a semi-structured interview in qualitative approach, a socio-demographic questionnaire that was analysed quantitatively, and a network chart and network grid providing data for both qualitative and quantitative analyses. Additionally, **Chapter 2** indicated that there are technological, social and political issues related with the implementation of an e-government, and there are research hypotheses and quantifiable measures of variables in the research towards e-government adoption. Therefore, in the context of this research, interview based qualitative research to explore e-government adoption factors,

and survey based quantitative research to investigate e-government adoption in Egypt, were chosen.

4.3 A Multi-Stage Research Design

Myers (1997) and Mingers (2001) argue that, although most researchers conduct qualitative or quantitative research, some researchers have recommended mixing them in one study. According to Johnson et al., (2007), this multi-method research is a synthesis that includes ideas from both qualitative and quantitative research. Furthermore, Stake (1995) notes that qualitative researchers look for understanding of the interrelation of the phenomenon, whereas, quantitative researchers are keen to find the explanation and control the phenomenon.

Tashakkori and Creswell (2007) propose a broad definition to multi-method research and state that

"Research in which the investigator collects and analyses data, integrates the finding, and draws influences using both qualitative and quantitative approaches or methods in a single study or program of inquiry," this leads to the development of triangulation in research. Denzin (1978) defines triangulation as *"The combination of methodologies in the study of the same phenomenon*. According to Rossman and Wilson (1985: cited in Johnson et al., 2007), there are three reasons for combining quantitative and qualitative research:

1. Combinations are used to enable confirmation of each other as in triangulation.
2. Combinations are used to enable or to develop analysis that results in a richer data.
3. Combinations are used to explore new ways of thinking by mixing the two data sources.

Also, Jick (1979) defined triangulation technique by combining qualitative and quantitative methods, and these methods should be seen as corresponding and

complementary rather than contradictory. Therefore, for the purpose of conducting this research, a multiple-methods research study was found the most suitable.

In this study, the researcher decided to use the triangulation approach by using multiple qualitative and quantitative methods within the same study to create a form of triangulation, which would result in expanding the validity and reliability of the study (Denzin, 1978). Furthermore, Bryman and Bell (2007) argued that this multi method research approach occurs for filling the gaps *"when the researcher cannot rely on either a quantitative or a qualitative method alone and must buttress his or her findings with a method drawn from the other research strategy".*

First, Quantitative research in the form of survey questionnaires conducted with a random population of e-government services adopter and non-adopter citizens (as explained consequently) enabled testing the relationship between the research model variables in this study, and also provided evidence to support, or work against, the research hypotheses (Belanger and Carter, 2005; Gefen et al., 2002; Lee et al., 2005; Warkentin et al., 2002; Moon and Kim, 2001).

Second, Qualitative research through interviews conducted in the Ministry of Communication and Information Technologies and the National Information Technology Centre – Egypt, enabled deeper understanding of the factors that influence the adoption of e-government services by the Egyptians from a managerial perspective. It also provided us with up-to-date information about e-government in Egypt

Third, Qualitative research through interviews conducted with a sample of the population allowed deeper understanding of the factors that influence the adoption of e-government services by the Egyptians from a customer perspective. This was the third method of triangulating results with those obtained from the quantitative surveys and government official interviews.

The sequence of the research process follows what Creswell (2008) defines as "sequential procedures, in which the researcher seeks to elaborate on or expand the findings of one method with another method". Creswell (2008) also states that "the study may begin with a quantitative method in which theories or concepts are tested, to be followed by a qualitative method involving detailed exploration of a few cases or individuals". The literature review was an essential tool to determine the main issues related to the research problem, and to identify the most important variables. It was also an essential step to develop the survey instrument.

The second step of this research was the development of a quantitative survey instrument to test the relationship between the variables. Finally, qualitative interviews were conducted in 2 phases to elaborate and to refine the quantitative results. The following sections cover in detail the research methods employed in this study.

The following **Figure 4.3** below illustrates the research design. As the diagram shows, the literature review was a continuous activity during the research project. It also shows the administrative process that has been completed before the data collection stage.

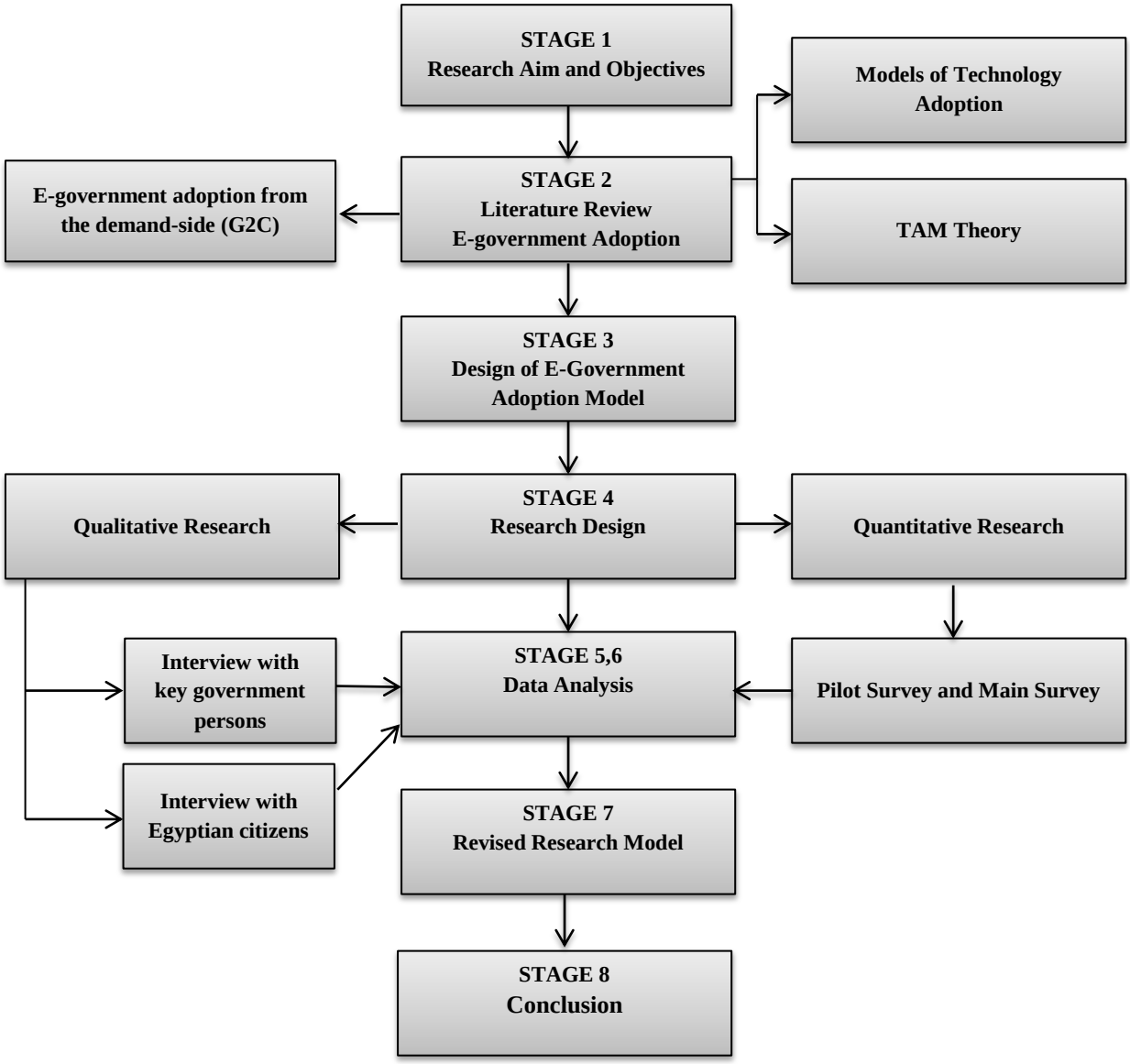


Figure 4.3: Research design activities and methods of the study

4.4 Data Collection Methods

This study aims to measure citizens' attitudes and intentions to use e-government services. Therefore, a large-scale survey questionnaire was used at the first stage of data collection to capture the views/usage patterns of e-government adopters and non-adopters regarding the different factors that affect utilisation of e-government services. Kaplan and Duchon (1988) suggested that "collecting different kinds of data by different methods from different sources provides a wider range of coverage that may result in a fuller picture of the research problem". In addition, diversifying the research methods increases the validity of the collected data and derived outcomes (Bouma,

1996). Therefore, as mentioned earlier in this chapter, this study used semi-structured interviews method in the second and third stages of data collection to provide a richer analysis from government officials and user population.

Survey questionnaires can be collected by a number of methods, including mail surveys, personally administered surveys (telephone or face-to-face), or over the internet surveys (Sekaran, 2003; Fink, 2006). The relative advantages and disadvantages of each type of survey method were considered here and the decision for using a personal survey method was justified. The selection of a suitable method depends on the cost, the available time, the characteristics of participants, restrictions, and the expertise of the researcher (Sekaran, 2003). In this study, it was very difficult to obtain random citizens' emails, phones, or mail address due to cultural restrictions and technical limitation. Thus, the face-to-face personally administered survey was the approach employed in this study. This also had the added advantage of interrogating the participant efficiently in open-ended questions and using the face and body language to capture richer results.

4.4.1. Questionnaire-based Survey design

This section illustrates how the research instrument was prepared to best obtain valid and complete information about the research problem (Cavana et al, 2001). The research objectives (**see section 1.4 in chapter one**) were translated into a series of questions, demographic questions, and model questions in order to understand the factors that affect e-government adoption from citizen point of view and the relationship between them (research question 2 and 3)**(see section 1.3)** The questions, and response formats, were standardised so that all participants were asked the same questions. To simplify administrative and data processing, most of the instrument questions were pre-coded, (Fink, 2006).

The questionnaire **(see appendix A)** was designed based on several guidelines, books and existing questionnaires from the literature (Jensen et al., 2005; Ackerman et al., 1999; Venkatesh et al., 2003; Holden and Karsh; 2010). The questions included technology acceptance factors expressed in previous studies explained in the previous literature chapter, namely website design, trust of (e-government & Internet), and perceived public value construct. Questions concerning TAM variables (Perceived usefulness, perceived ease of use, attitude, behaviour intention)added to the external variables were answered using a 5-point Likert scale (strongly agree to strongly disagree). All Other questions were multiple choice, "yes/no", a choice of multiple answers and few open-ended questions with comments.

Development of measurement scale

Churchill (1979) defined measurement as an operation carried out to determine the amount of variable that an object possesses. In this study, most of the scales used were Likert scales. The decision to use this scale was made after considering the fact that such a scale can conveniently show the responses from strongly positive, to strongly negative; with the midpoint indicating a neutral response. In addition, Likert scales are treated as interval scales, and they are the most frequently used scales in information systems research (Sekaran, 2003).

From the Likert scales, the five and the seven-point scales are the most commonly used scales (Malhotra and Peterson, 2006). However, with a 5-point scale, it is easier for the participants to read out the complete list of scale descriptors (Agree, strongly agree, etc).

Also this scale was used in previous TAM related research (Igbaria et al., 1995; Teo et al., 1999, Pikkarainen et al., 2004; Shih, 2004). In the previous researches the people who did not use e-government services (non-adopters group) were not included in the

surveys concerning testing TAM model. However in this research those people are included in testing the model, therefore a new option ‘ I don’t know’ was added to five Likert scale to become 5 Likert scale with an added unrelated option. See **Figure 4.4**

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree	I don’t know

Figure 4.4: Five point Likert scales

Preparing draft instruments

The next step in instrument development was to draft the question wording, response format, and sequences of questions. Principles of good question design advocated by Cavana et al (2001) were adopted to minimise measurement error; these principles relate to the content, wording and structure of each question:

In relation to question content, only brief, relevant questions needed to collect the data were asked; there were no double –barrelled or sensitive questions; and only a modest amount of effort by the participant was required to complete the instrument.

In relation to question wording, care was taken to ensure that words had only one meaning; that there were no double negatives; there were no leading or biased words or phrases; no abbreviations or incomplete sentences; and all questions were stated positively as recommended by Cavana et al (2001).

In relation to question structure, all questions had a clear structure. Two types of structured questions were used: scale, and multiple-choice questions.

To ensure that measurement error in design was minimised, the instrument was pre-tested using a pilot and adjusted accordingly. Demographic questions were incorporated at the first page of the instrument. The other questions (model – related questions) were

ordered, and questions on the same topic were put together. The purpose of the study was explained in the introduction of the questionnaire. The confidentiality and the privacy of the participants were also assured in the cover letter. Furthermore, in order to provide legitimacy, the university, the researcher, and the supervisor were named as the sponsors of the study. Finally, each participant's consent was taken to answer the questionnaire by signing the document that they agree to participate.

The following **Table 4.2** shows the questions in the draft instrument. There were 8 constructs, and total of 33 items to measure them. Website design with 6 items that were self-developed based on previous literature from Alanezi et al (2010), Yang et al (2004). Trust in the Internet with 3 items, trust in the government with 4 items which were adopted from Carter and Belanger (2005), Wangpipatwong et al (2005), Collier and Bienstock 2006, and Fassnacht & Koese (2006). Perceived public value with 4 items which were adopted from from Pura (2005). Perceived usefulness with 4 items and perceived ease of use with 4 items both were adopted from Davis (1989), Davis et al (1989), and Carter and Belanger (2004). Attitude towards using with 3 items which were adopted from Taylor &Todd (1995), Jarvenpaa et al (2000), and Vassilakis et al (2005). Behavioural intention to use with 4 items which were adopted from Malhotra & Galleta (1999), Gefen & Straub (2000), and Pavlou (2003). And finally construct of Actual use with 1 item which were developed from Davis (1989), Davis et al (1989), and Carter and Belanger (2004). Each of these scales was examined in the pilot test. These question were used all the citizen whether they were adopters or non adopters.

Table 4.2: Construct items questions

Construct	Code	Statement
Perceived Usefulness	PU1	Using e-government website(s) enables me to accomplish my understanding of services and increase productivity.
	PU2	Using e-government website(s) will improve my performance in my transactions with the government.
	PU3	Using e-government website(s) can improve the service quality that I receive compared to dealing with real people for the same service.
	PU4	Using e-government website(s) is useful for me.
Perceived Ease of Use	PEOU1	Learning how to operate e-government website(s) would be easy for me.
	PEOU2	I would find it easy to get the e-government to do what I want it to do.
	PEOU3	It would be easy for me to become skilful at using the e-government services on the internet.
	PEOU4	I would find the e-government easy to use.
Attitude Towards Using e-government services	ATU1	I like the use of e-government website to access government service(s).
	ATU2	Using e-government website(s) to access e-government service(s) is a good idea.
	ATU3	Using e-government website(s) to access e-government service(s) would be pleasant experience.
Behaviour Intention to use e-government	BI1	I intent to use e-government services in the next two years to come.
	BI2	I intent to use e-government services on regular basis in the future.
	BI3	I intent to use e-government services in my next application of renewing my national id.
	BI4	I will strongly recommend others to use e-government services.
Website Design	WD1	E-government website(s) are available with well organised structure and easy links.
	WD2	E-government website(s) are visually appealing.
	WD3	E-government website(s) provide up to date information.
	WD4	E-government website(s) present information in a simple and understandable manner.
	WD5	E-government website(s) contain links to other websites that citizens may be interested in.
	WD6	E-government website(s) tell me what to do if the service cannot be offered.
Perceived Public Value	PPV1	E-government website(s) is an efficient way to manage my time.
	PPV2	E-government website(s) provides better value of money.
	PPV3	E-government website(s) increases the government transparency.
	PPV4	Overall, I believe that using e-government website(s) to access government services provides good public value.
Trust in Internet	TI1	E-government website(s) have enough safeguard (e.g. security policy to make me feel comfortable using them to access government services)

	TI2	In general, the internet is now a robust and safe environment in which to transact with the government.
	TI3	I am confident that the data I submit through the government website(s) will not misused and will be treated confidentially.
Trust in government	TG1	The government can be trusted to carry out online transactions faithfully.
	TG2	I trust the government because they keep my best interest in mind.
	TG3	I am confident that the forms I submit through the government website(s) will be processed and not ignored.
	TG4	In my opinion, e-government website(s) and government are trustworthy.
Actual Use of e-government	AUEG	Did you ever use e-government service

Evaluating the reliability and the validity of the instrument

The reliability of a measure refers to the degree to which the instrument is free of random errors. It is concerned with consistency and stability of the measurement (Sekaran, 2003). Cronbach‘s coefficient alpha values were tested to examine the internal consistency of the data post-gathering, and a measure of reliability (Hinton et al., 2004; Field, 2005). It examine how closely related a set of items (questions) are as a group for certain factor.

Cronbach‘s coefficient alpha values were chosen to examine the internal consistency of the measure (Hinton et al., 2004; and Field, 2005) (see **Table 4.5**). Hinton et al., (2004) have suggested four different points of reliability: excellent reliability ranges (0.90 and above), high reliability (0.70- 0.90), high moderate reliability (0.50-0.70) and low reliability (0.50 and below). The result of this test will be explained in the following chapters.

The next step was to assess the validity of the instrument used for this study. Validity is defined as the extent to which the instrument measures what it purports to measure. In this research, validity of the questions was assessed with factor analysis which will be explained later in the next chapter. The results are provided in the next chapter.

Questionnaire Translation

Given that the majority of the Egyptians are communicating in Arabic, the questionnaire items of the pilot study and the main study were translated into the Arabic language. Therefore, the researcher provided the questionnaire in both languages, English and Arabic, to maximise the effectiveness of the data collection.

The researcher took into consideration the accuracy, fluency and facility of use in terms of translation as ineffective, inaccurate translation could lead to misconstrued meaning and misunderstanding (Saunders et al., 2003). This would greatly hamper valid data collection.

In order to maximise validity, the researcher followed two distinct phase processes. In the first phase, the researcher translated the English version of the questionnaire into Arabic. Then, in the second stage, the Arabic version was translated back into English by an interpreter. The initial English version was compared with the translated one. Furthermore, both English and Arabic versions were checked by three persons who are professional translators in English and Arabic, one of them holds a PhD degree and the other two hold masters degrees in Language and Communication college in Alexandria. This ensured accuracy during the translation process (Saunders et al., 2003)

Pre-testing the instrument via pilot survey testing

A pilot study was used as part of the development methodology in order to complete the 'trying out' or pre-testing of a particular research instrument (Baker, 1994), in this case the survey questionnaire. Conducting the pilot study had two main aims: to improve the questions and to test respondents' comprehension and clarity before the actual survey was administered (Saunders et al., 2003; Miles and Huberman, 1994).

- Pilot study sample

Despite the fact that there is no common agreement about the sample size for the pilot survey, Hunt et al (1982) recommended a sample size between 12 and 30 for the pilot study. However, the larger the sample, the more accurate the results are (Emory & Cooper, 1991). Therefore for the pilot study, university students, employees who were Egyptian citizens and random café users were identified as the pilot sample to try to diversify the age, gender, educational and social levels of the participants. A survey was carried out with 49 café users, students and employees from the MIS department at Arab Academy of Science and Technology, College of Management and Technology in Egypt. Five incomplete surveys were exempted from the analysis. Thus, 44 of the returned surveys were usable responses. Of the surveys analysed, 23 respondents (52.3%) were female and 21 (47.7%) were male. Most of the respondents had considerable experience in using a computer. 76.3% of the respondents had more than 3 years of computer use. Moreover, 43.2% of them used the internet daily, with 47.8% weekly. The author received comments and suggestions that helped in improving the questionnaire and led to the removal and modification of some questions. These comments and suggestions concerned the wording or format of some statements.

4.4.1.1 Sample population of the main study

Probability samples as described by Robson (2002) include:

- Simple random sampling, which involves the selection at random from the sampling frame of the total required number of persons for the sample – the population. This gives each person an equal chance of being included in the sample and it also makes all possible combinations of persons for a particular sample size equally likely. It minimizes the fact that there will be systematic bias in sampling.

- Another type is systematic sampling, where only the first person is chosen at every starting point for example choosing a starting point at random in the sample frame then choosing every nth person. A drawback of systematic sampling is that possible combinations of people might not be chosen.
- Stratified random sampling involves dividing the population in a number of groups or strata where members of groups share a particular characteristic(s) e.g. Females and males.
- Another sampling technique is cluster sampling, which involves dividing the population into a number of units or clusters, each of which contains individuals having a range or characteristics where the clusters are chosen randomly.
- Multistage sampling is picking random individuals in random clusters determined when using a clustered sampling technique.

Accordingly, after the study of relevant sampling strategies, it was determined that a multi stage sampling with a random sample from each of the following clusters was used: students, post graduate students, and Internet café users. This sampling technique was used to concentrate on clusters of the population where the largest number of computer literate participants could be attained, which is a characteristic expected in both adopters and non-adopters questioned in this research (since the factors investigated in this research would not apply to computer-illiterate citizens and are outside the scope of this research). Furthermore this technique is used frequently when a complete list of all members of the population does not exist and is inappropriate, which applies to this research. Also due to the political and safety issues in Egypt the researcher could not address all the geographic locations in Egypt and sectors of the Egyptian community. Generalisations however are feasible to be produced because the sample was randomly selected from the previous categories reflecting people with diverse demographic characteristics i.e. in gender, age, educational and social levels.

Students and Internet café users who are Egyptian citizens were identified for the study sample. Arab Academy for Science and Technology and Maritime Transport (AASTMT) was selected to distribute the survey because it contains graduate and post graduate students from all cities of Egypt, due to being one of the largest private universities in Egypt, located in 3 major cities in Egypt (Cairo, Alexandria, Portsaid).

In order to make sure the sample population represented diverse parts of the country, the selected branches from AASTMT were from 3 big cities in Egypt, 2 branches from Cairo (capital of Egypt), 2 branches from Alexandria (second big city in Egypt), and one from Portsaid. The following **Table 4.3** summarizes the selected branches attributes.

Table 4.3 summarizes the selected branches attributes.

Name	Arab Academy for Science and Technology and Maritime Transport	
City name	Alexandria (Head quarter)	
Branch name	Miami	Aboukier
No of facilities	3 colleges	5 colleges
Selected facilities	Management and Technology and Graduate school of Business	Engineering and Technology
City name	Cairo	
Branch name	Dokki	Heliopolis
No of facilities	2 colleges	5 colleges
Selected facilities	Management and Technology	Engineering and Technology
City name	Portsaid	
Branch name	Portsaid	
No of facilities	1 college	
Selected facilities	College of Maritime Transport	

The sample size was calculated to guarantee a sufficient number of respondents. Thus the following formula was used to estimate the population sample size (Sekaran, 2003):

$$\text{Minimum Sample Size (n)} = \frac{t^2 * p * (1-p)}{m^2}$$

Where

n = required sample size (minimum size)

t = Confidence level at 95% (standard value of 1.96)

p = Estimated fractional population of subgroup

m = Margin of error at 5% (standard value of 0.05)

The number of respondents in each subgroup was calculated based upon data in the following table (The Central Intelligence Agency, 2013):

Egypt Population	85,294,388 (at time of conducting the data collection)
Age structure	**0-14 years:** 32.3% (male 14,100,807/female 13,474,763) **15-24 years:** 18% (male 7,861,197/female 7,471,045) **25-54 years:** 38.3% (male 16,565,411/female 16,072,992) **55-64 years:** 6.6% (male 2,801,205/female 2,842,786) **65 years and over:** 4.8% (male 1,844,456/female 2,259,726)

$$\textbf{Minimum Sample Size (n)} = \frac{1.96^2 * 0.677 * (1-0.677)}{0.05^2} = 334$$

4.4.1.2. Survey administration

As mentioned before, the face-to-face personally administered survey was one of the research methods adopted in this study. The final questionnaire (see **Appendix A**) was distributed to a random sample of 1500 people drawn from the faculties of the above universities, and from the Internet café users in Egypt. According to Leedy (2005), the most important two elements than any others in survey research, are randomisation and bias. The processes of administrating the survey in the selected colleges and the Internet cafes are illustrated in **Figure 4.5** and **Figure 4.6** respectively. Note that the classes

were on different days of the week, different times of the day, different years and different subjects to avoid bias.

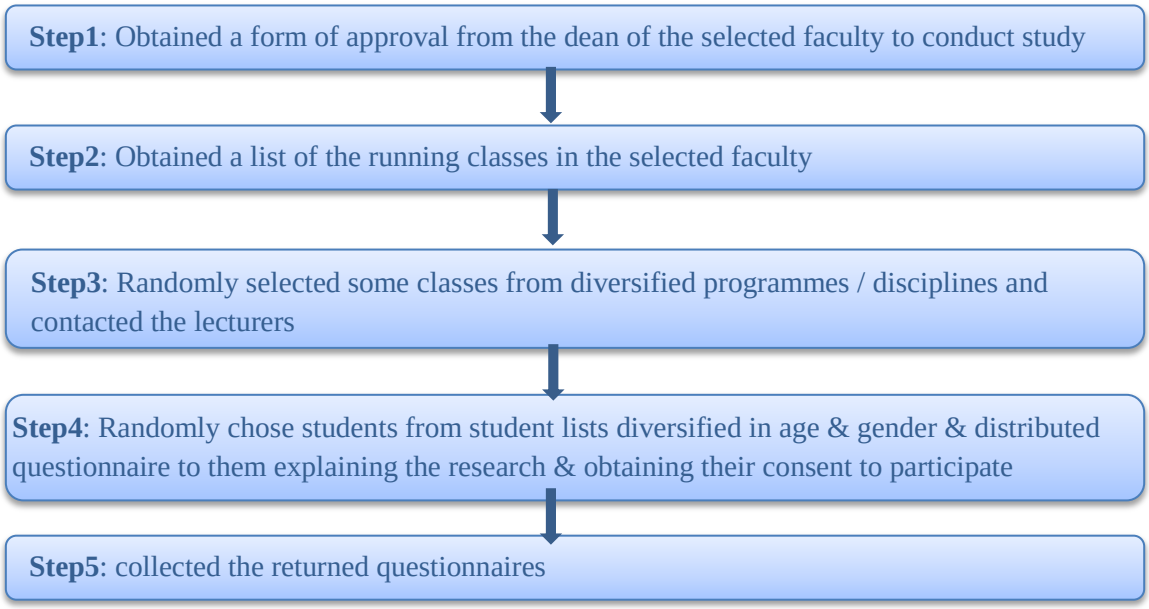


Figure 4.5: Survey administration process in the selected colleges

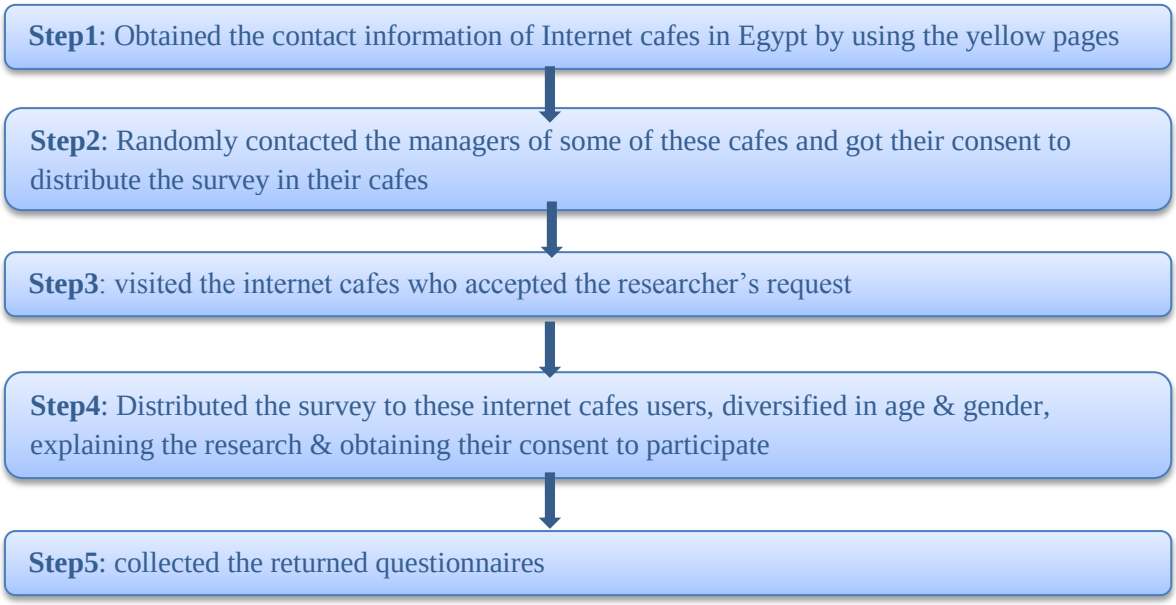


Figure 4.6: Survey administration process in the selected Internet cafes

The overall quantitative research process is captured in **Figure 4.7** below.

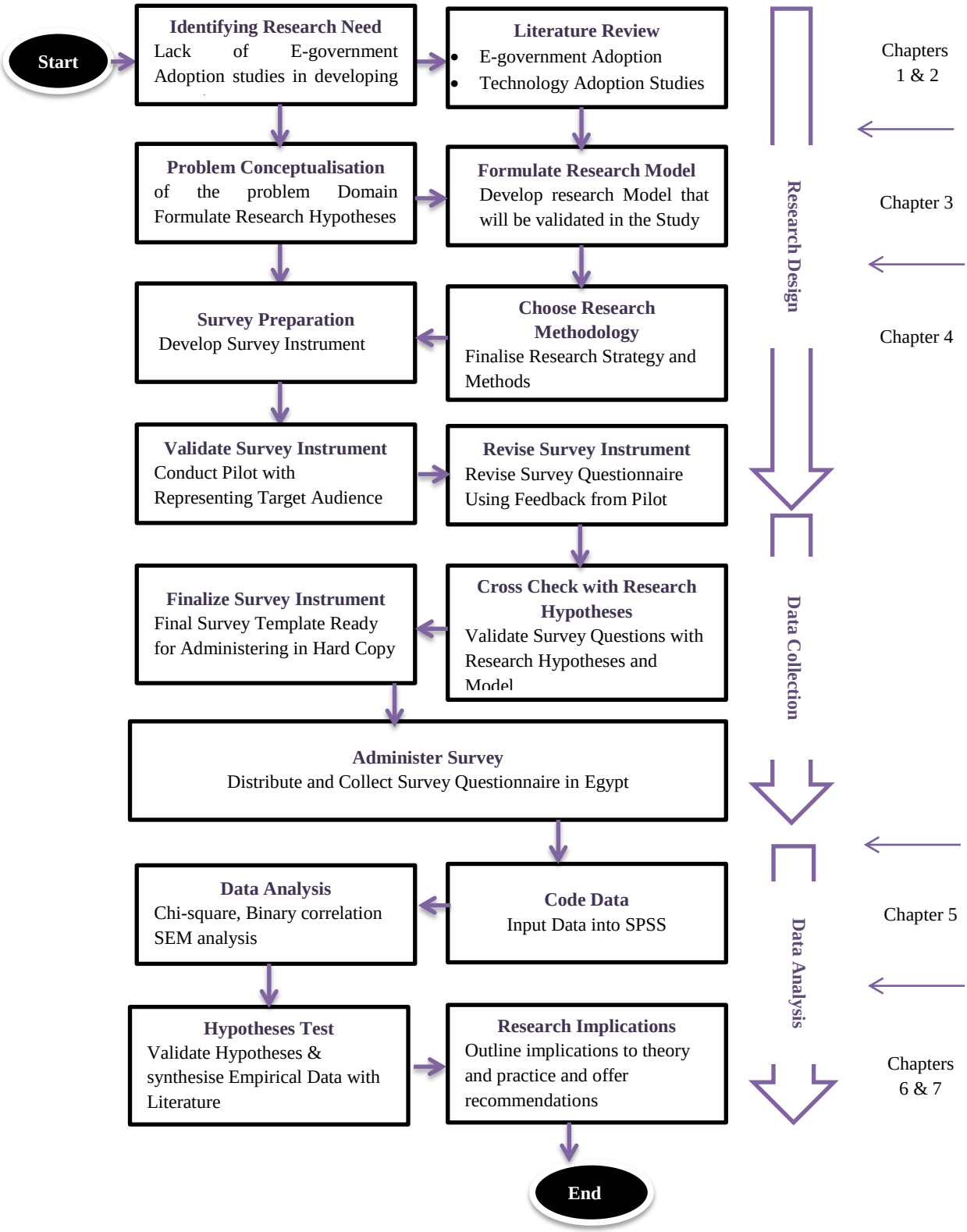


Figure 4.7: The Quantitative Research Process

4.4.2. Qualitative Research Methods – Interviews

Several types of qualitative research have been termed. One of these is Ethnography (field research). Ethnography represents a detailed study of life and activities of a group of people by relying on observation of their ways of acting, believing and feeling (Feagin et al., 1991). Although ethnography might seem relevant to this research topic but it still might not obtain and elicit the required understanding of user's perceptions towards E-government because according to the literature reviewed earlier it has been investigated that this topic was best researched using mostly surveys like questionnaires, interviews, focus groups and scenarios. Observations in particular and ethnography as an approach have not been adopted in this research context due to the inability and non-feasibility for closely monitoring a particular group of users in this area which might not require e-government adoption daily but over extended and irregular periods of time. Also this research requires the understanding of technology acceptance factors towards e-government from randomly selected citizens giving a chance for a larger scope and a fairly equal chance for anyone to be respondent.

Two sociologists Barney Glaser, and Anselm Strauss originally developed ***grounded theory methodology*** (Strauss et al (1994).

Based on the literature and the study of different research methods, grounded theory approach has given the guides to the researcher in the interview and designing the questions. Due to it being relevant for qualitative research as a whole in several ways, but identifying an issue as a topic for a grounded theory study includes a decision for a research perspective aiming at developing a new theory, which is not the case in this research.

It also includes finding the problem that makes it worth studying from a theory development perspective and it includes constructing a phenomenon as a specific

research issue (Flick, 2009). However, it has not been adopted as the main method because it wasn't very relevant for the research scope (which does not aim for theory development). A content analysis was used in this research to analyse data from the government and citizen interviews

Interviewing as a research method typically involves the researcher asking the questions and receiving the answers from the interviewee (person interviewed). It is very widely used in social research and there are three different types of it. The different types of interviews are structured, semi-structured and unstructured interviews, which depend on the depth extent of the response sought (Robson, 2002). Structured interviews are usually also known as interview surveys in a questionnaire form, yet questionnaires still can be of different structures. Semi-structured interviews allow the interviewee or participant much more flexibility of response. Unstructured interviews are used in face-to-face interviews, as conversation is able to flow more naturally between the researcher and the respondent. However, they can be used in telephone interviews and are sometimes referred to as open-ended questions.

In this research, semi- structured Interviews were employed as the data collection method. The reason for this choice is that interviews are the most fundamental of all qualitative methods to help generate insights (Louise, 1994) into how respondents see the studied phenomenon. Through this method the researcher can best access the views that participants have regarding actions and events, which have taken or are taking place, along with the views and aspirations which they have of themselves and other participants.

Through the one-to-one meeting between the researcher and the interviewee, a semi-structured interview technique gives the researcher the opportunity to probe deeply to uncover new clues and open up new dimensions of the studied phenomenon. This helps

greatly in securing accurate accounts that are based on the interviewees' personal experiences. Easterby-Smith et al. (2002) confirm that the semi-structured interview is an appropriate method when it is necessary to understand the constructs that the interviewee uses as a basis for his/her opinions and beliefs about a particular situation. In this research interviews were conducted in 2 phases for triangulation of results:

- With main stakeholders (Egyptian government people) who are responsible for providing e-services to citizens
- With the citizens themselves who use or do not use e-government services

The government interview questions (see appendix E) mainly designed to answer both research questions 2 and 4 **(see section 1.3)** the questions mainly were concerned to understand the barriers that face the government in the implementation of e-government services in Egypt and also to understand from the government point of view what makes people adopt these services. The citizen interview questions (**see appendix F**) were designed to map between the citizen questionnaire and government interviews, these questions were concerned with both (adoption and implementation facrors)

Selecting Organisations and Interviewees

The choice of whom to interview for this specific research purpose and where was crucial. The selection of interviewees for this research was purposive rather than random. Purposive sampling is common in qualitative research. The reason is that the research is interested in decision-makers who provide e-services targeted to citizens within the Egyptian e-government context. So the key government officials were chosen who are currently in control of the e-government program in Egypt in both the Ministry of Communication and Information Technologies (MCIT) and the National Information Technology Centre (NITC). Only those who are involved with the e-government

program were interviewed. Consequently, interviews were conducted with the following government officials:

1. Director of E-Operations – NITC
2. Quality, Risk and Communication Manager- MCIT
3. Head of E-services and strategic planning - MCIT
4. Head of Change Management – NITC
5. The E-government Projects Coordinator – MCIT

The key e-government officials were selected to provide in-depth information about e-government services and strategies in Egypt. Semi-structured interview questions were designed to explore the officials' experience and perceptions regarding e-government adoption in Egypt. It was also designed to survey the current progress, planned future and main challenges for Egyptian's e-government program. The outcomes of these interviews were employed to complement the questionnaires' results and interviews with citizens hence triangulating the research results.

For interviews with the Egyptian citizens, the interviewees were chosen to match all categories of the defined demographic variables (age, gender, and educational level) in the main survey questionnaire (explained in subsequent chapters) and they were chosen randomly. The questions provided were focused on obtaining in-depth information about perspectives on e-government services and challenges for its adoption nationwide (hence complementing government official interviews) as well as individually (hence complementing questionnaire results).

4.5 Data Analysis

Qualitative Data Analysis

The collected raw data (direct tape recordings, and field notes) had to be processed before they were available for analysis. Interview recordings were transcribed. The

researcher, while listening to the tape, made notes, selected quotes and wrote her own comments. As all the interviews were conducted in Arabic, the translation into English was a long process to translate the meanings not just the exact words. Special care was taken with word emphases, facial expressions, explanatory gestures in order to reach a smooth and clear summary of the main ideas presented by the interviewee.

For citizens' interview analysis, was first transcribed to extract the information relevant to the study. Interview data were written with quotations or specific evidence (Creswell, 2002) and analysed manually and with the help of references on qualitative analysis. After doing so, codification (explained below) was made to find main categories, ideas and connections between the data gathered quantitatively and qualitatively. Content analysis is usually used when analysing qualitative data, which was used in this research. Content analysis has been recognized for over 50 years (Weber, 1995) and is widely used as an analysis tool in qualitative research (Weber, 1995; Krippendorff, 2004). Krippendorff (2004) defines content analysis as: "the use of replicable and valid method for making specific inferences from text to other states or properties of its source". Some suggest that content analysis allows closeness to the text, which can provide valuable cultural visions and/or understanding of human thought over time. According to krippendorff, content analysis provides new insights and increases researcher understanding of a particular phenomenon.

As for government interview analysis, the information obtained from each interview was analysed separately where each interview was first broken down into themes as described in Miles and Huberman (1994),. These themes had been already specified at the beginning of the semi-structured interview document before conducting the interviews. The reason for this thematic analysis was to identify the issues that are important in order to understand the e-government development in Egypt. According to those themes, meanings were assigned to the descriptive information compiled during

the interviews. At first, a start list of provisional meanings or "codes" was created. This list came from different sources including the research model, research questions and literature review. This level is called first level coding.

In the next level of analysis, the codes from the first level were grouped into a smaller number of sets or themes. Therefore, trees of basic categories and subcategories (hierarchical code system) were developed which helped in describing the features of the data, and spotting the relations between categories and sub-categories (axial coding) . This grouping into categories helped to reduce a large amount of the data into a smaller number of analytical units. As a final step, data interpretation of all themes, categories were presented to develop a list of key points and important findings, which were discovered as a result of categorization and sorting of the data.

Also, due to the large amount of the data that needed to be analysed, the coding process for the interviews was done using NVivo (as shown in **Figure 4.8**) to follow a systematic approach to analysing and reducing the vast amount of data. The software was used to code the data visually and in categories, annotating and gaining accessed data records accurately. Using the data reduction technique available within NVivo, the outcomes of the data was illustrated in a model, which helped in explaining the findings as shown in **chapter 6**.

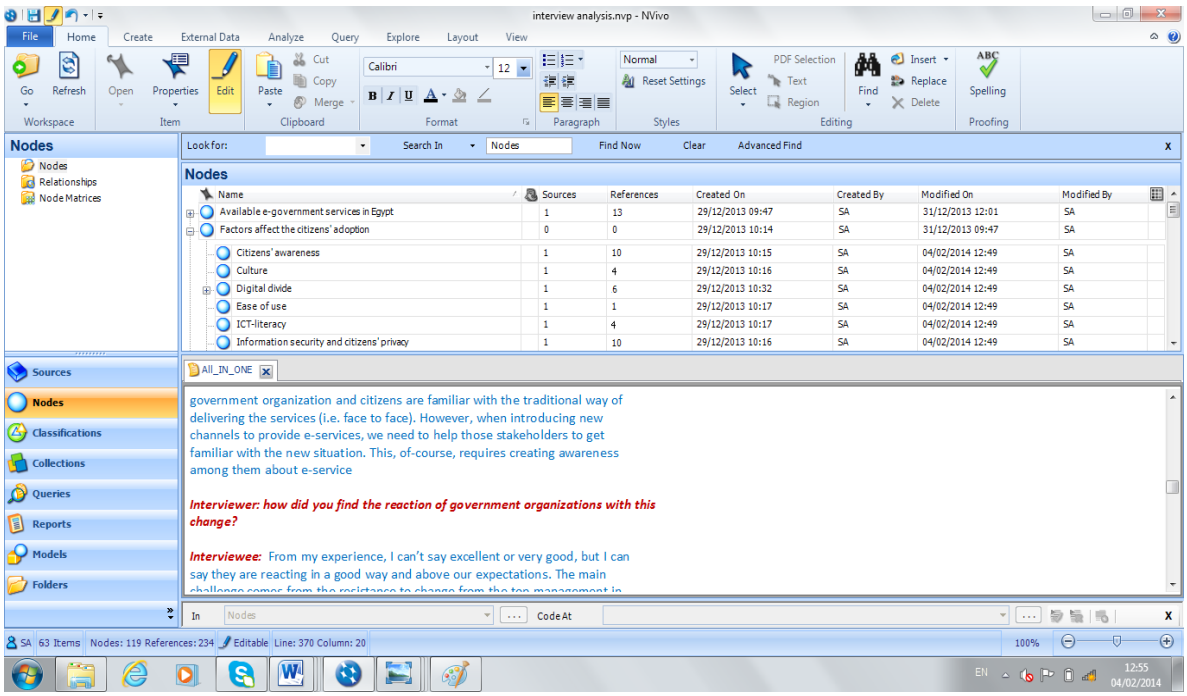


Figure 4.8: NVivo coding with sources

Quantitative Data Analysis

Data obtained from the quantitative method was statistically analysed. The logical sequence of the statistical tests was adopted from best practise in previous e-government adoption literature (e.g. Carter and Belanger, 2005; Phang et al. 2005). First, descriptive statistics were used to summarise the demographic variables (refer to **Section 5.3**). Chi-square test was used to find out any notable differences between those who had adopted e-government, and those who had not. The next step was to assess the reliability and the validity of the instrument used for this study, and that was done by using Cronbach's alpha. The objective of this assessment was to design the questions so that it accurately and consistently measures what it is supposed to measure (Sekaran, 2003). In this study, validity of the scales were assessed using factor analysis, also elaborated on in chapter 5.

Finally, Structural Equation Modelling was performed to explore the overall structural model all at once and to investigate the unique contribution that the variables made to

the dependent variable to which they were linked. Path analysis was used to refute or not refute the hypotheses inside the model

4.6 Ethical consideration

This final section deals with the ethics considerations. Ethical practices ensure that, while participants are encouraged to respond, they are not pressured to do so in an offensive way, their confidentiality is assured, and they are protected from misrepresentation and exploitation (Cavana et al, 2001; Fink, 2006).

To address the ethical issues rising from the study, a human ethics application, questionnaire, interview questions were submitted and approved by the University Research Ethics Committee before commencing the study **(Appendix C)**.

Information about ethical issues was provided in the human ethics application. Such information included the purpose and nature of the project; the research plan and procedures; the entirely voluntary participation; the protection of confidentiality and privacy of participants, storage access, and disposal of data.

Approvals from the four universities and from MCIT were obtained before distributing the survey and before conducting the interviews. Also, when potential participants were first contacted, they were provided with an information sheet which described the project aims and what would be expected from them. It also assured voluntary participation and confidentiality/ anonymity of data and stated that participants were able to withdraw from the study at any point during data collection from them without penalty. Participants were informed that return of a completed survey was confirmation for their consent. However, as returned surveys would be anonymous, the information sheet advised that withdrawal of data after return of the survey would not be possible.

4.7 Summary

This chapter described and justified the methods used to test the research questions and hypothesises. The chapters also justified and explained the use of a combined approach of qualitative and quantitative strategies to explore the objectives of this research. The process of the development and validation of the instrument was also provided. This study used two data collection strategies, survey and semi-structured interviews, conducted in 3 data collection phases for triangulation. The process of sampling was explained drawn from the Arab Academy for Science and Technology and Maritime Transport University student population and Internet cafe users in Egypt. Semi-structured interviews were conducted with the key government officials in the Ministry of Communication and Information Technologies, and the National Information Technology Centre who are looking after the e-government program in Egypt, and interviews were conducted with citizens. The chapter also discussed the consequence of the ethical considerations. The next chapter discusses the analysis steps undertaken for quantitative data and presents the results arrived at. The chapter also presents the results in accordance with testing the proposed hypotheses in this study.

5. Quantitative Data Analysis and Discussion

5.1. Introduction

The purpose of this chapter is to report on the analysis of the data collection used to test the hypotheses presented in this research. It begins by describing the procedures used for data preparation. This is followed by discussing the response rates and descriptive statistics of participants who were randomly selected as adopters of e-government in Egypt. Chi-Squared test was used to see if there was any association between the demographic data and adoption/non-adoption numbers. In addition, this chapter describes the validation process undertaken in this study. Cronbach Alpha was used to measure internal consistency for survey and research variables. Also this chapter provides the results for factor analysis, which was done by using principle component factor analysis in SPSS. This chapter also presents the results of testing the structural model and research hypotheses related to the research model.

The Structural Equation Modelling (SEM) method was used to test overall model. The rationale of the sequence of the applied statistical tests is provided in this chapter. Finally at the end of this chapter a discussion is provided of the main findings of the quantitative data collected for the purpose of answering the research question. The following **Figure 5.1** shows the chapter outline:

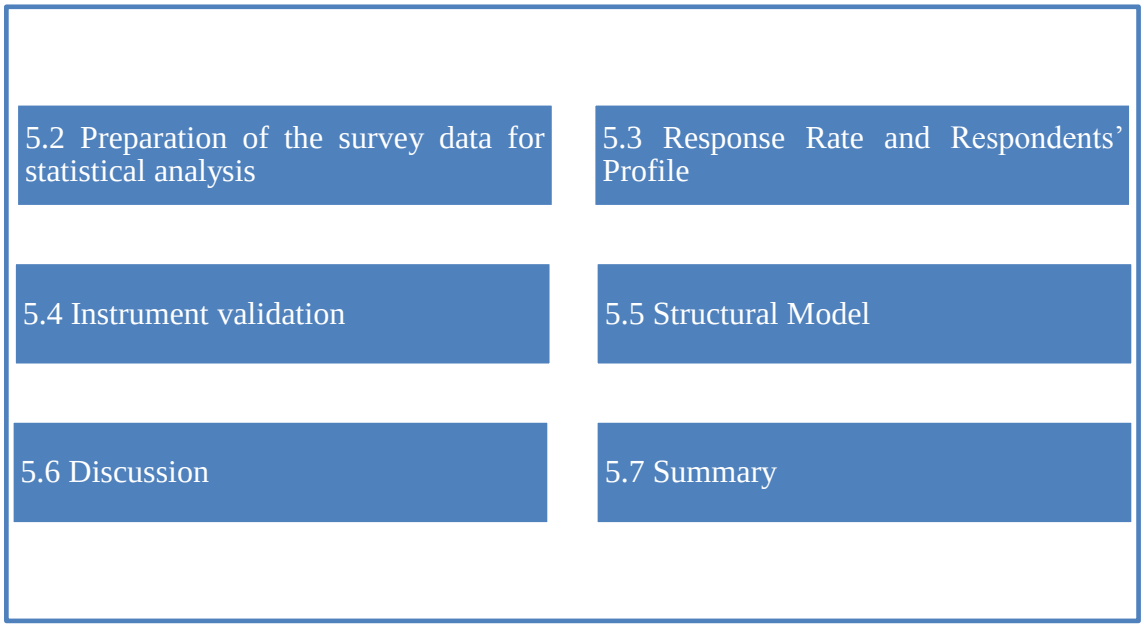


Figure 5.1: Chapter Outline

5.2. Preparation of the survey data for statistical analysis

According to Fink (2006), data preparation includes data coding, data entry into a database, data cleaning, and finding missing responses. This research followed the data preparation procedure undertaken by AL-Shibily (2006), which includes the following steps:

1- Visually checking the raw data once they were received.

2- All data sets were numbered as they were returned and reviewed for eligibility and completeness to check if they were completed by eligible respondents. For example, if a participant answered all questions exactly the same, the data was considered ineligible.

3- The data from the usable responses was entered into SPSS 18 statistical package.

4- Frequencies were computed using SPSS for each variable to check for missing data and outlier responses.

5.3. Response Rate and Respondents' Profile

Questionnaires were distributed to 1500 participants randomly chosen from university students, postgraduate students and internet cafe users in Egypt. The description of the sample population is illustrated in the Methods chapter (4) **(section 4.5.1**). A total of 910 surveys, were returned hence the total response rate obtained in this research was 60.6%. From the 910 surveys collected, 13 were considered unusable because they had many missing response items. The remaining 897 surveys were used in the analysis. 335 (37%) of the respondents were e-government information and services adopters. 562 (63%) of the respondents were e-government non-adopters. The data was divided into two groups - those respondents who indicated that they had adopted e-government, and those who had not. In this section, the Chi-square test (explained subsequently) was used to find out any notable differences between the two groups according to the demographic variables (age, gender, Educational level), and the results were shown in the following sections.

Gender

Table 5.1:
Gender as a determinant of E-government adopters and Non-adopters

Gender	**Male**		**Female**		**Total**
	Number	Percent	Number	Percent	
Adopters	221	66	114	34	335
	(179)		(156)		
Non-Adopters	257	45.7	305	54.3	562
	(299)		(263)		
Total	478		419		897
X^2 Test (N=897) **Gender x E-government Adoption**					
	Value		**Df**		***P*(2-sided)**
Pearson X^2	34.545		1		<.001

The observed values are shown in black and the expected values in red which was calculated according to the following equation:

$$E = \frac{row\ total \times column\ total}{grand\ total}$$

Table 5.1 exemplifies that from the adoption of e-government amongst the Egyptian citizens, there are 66% males compared to 34% females. On the other hand, within the non-adopters, females 54.3% exceeded males (45.7%) showing a minimal difference between them.

This clearly shows that the percentage of males who make use of e-government in Egypt is more than females. To verify if this result is significant or not and due to the categorical nature of the gender variable, the chi-square test for independence was employed.

Generally speaking, there are 2 types of chi-squared (x^2) test, the first one is concerned with the goodness of fit which allows the researcher to hypothesise that a distribution behaves in a particular manner and it is used to determine whether the observed distribution conforms to the model hypothesized by the researcher in the null hypothesis. The second test is test for independence, which is used in this research. This test is used to test whether there is relationship between two categorical variables or not i.e. the difference between the results is significant not due to randomness between the 2 variable data. It examines whether the observed pattern between the variables in the table is strong enough to show that the two variables are dependent on each other or not (Zibran M., 2012; Gingrich P., 1992). The chi square test for independence is conducted by assuming that there is no relationship between the two variables being examined which is called the null hypothesis (H_0) i.e. knowing the values of one does not predict or affect the values of the other. The alternative hypothesis is that there is some relationship between the variables. If we succeed in refuting the null hypothesis, then this can be evidence that the variables might be dependent i.e. there is a significant difference between the results. In this case:

$H_{0:}$ No relationship between gender and e-government adoption

$H_{1:}$ Some relationship between gender and e-government adoption

X^2 is Chi squared test notation, df is the degree of freedom which is equal to (number of rows-1)*(number of columns-1) and p is the level of significance, its value is compared to a 0.05 (low significant) or to 0.01 (significant) or to 0.001 (highly significant) to find out the level of significance (Zibran M., 2012). The result X^2 is compared to the critical values of chi squared distribution, which is based on the level of significance and the degree of freedom. If the chi square result exceeds the critical chi square value, then reject the null hypothesis and accept the alternative hypothesis that there is evidence for an association between the two variables, and hence the observed data could be significantly different, i.e. far from and not similar to the expected data. If the result does not exceed the critical value then do not reject the null hypothesis that there is no association between the 2 variables and that any variation from the expected results can be attributed to randomness.

As **Table 5.1** demonstrates, with 1 degree of freedom, and 0.001 significant value, the critical chi square value is 10.828 (see **Appendix B**). Since x^2 value 34.545 > 10.828, then we can reject the null hypothesis, therefore there is statistical evidence to indicate that there might be a significant difference between adopters and non-adopters results, according to their gender (with a $X^2(1, N=897) = 34.545$, $p<0.001$), i.e. there might be a relationship between gender and e-government adoption

Also a binary correlation test was conducted to examine any association between the gender of respondents and e-government adoption, Spearman's correlation coefficient is a statistical measure of the strength of a monotonic relationship (A monotonic

relationship is a relationship that does one of the following: (1) as the value of one variable increases, so does the value of the other variable; or (2) as the value of one variable increases, the other variable value decreases between paired data. It is denoted by $R_{s,}$ its interpretation the closer R_s is to +-1 the stronger the monotonic relationship. Correlation is an effect size and so we can verbally describe the strength of the correlation using the following guide for the absolute value of R_s (Sekaran 2003):

- .00-.19 "very weak"
- .20-.39 "weak"
- .40-.59 "moderate"
- .60-.79 "strong"
- .80-1.0 "very strong"

The following **Table (5.2)** shows the results obtained. The finding suggests that there is a significant positive weak correlation between the respondents' gender and e-government.

Table 5.2:
Spearman's rho Correlations which show the association between Gender and E-government Adopters

		E-government Adoption
Gender	Correlation	0.248(**)
	Sig. (1-tailed)	.000
	N	897
** Correlation is significant		
at the 0.01 level		

Age

Table 5.3:
Age as a determinant of E-government adopters and Non-adopters

Age	**18-30**		**31-39**		**40-50**		**>50**		**Total**
	Frequency	%	Frequency	%	Frequency	%	Frequency	%	
Non- adopters	348	61.9	121	21.5	65	11.6	28	5	562
	(384)		(107)		(50)		(21)		
Adopters	265	79.1	50	14.9	15	4.5	5	1.5	171
	(229)		(64)		(30)		(12)		
Total	613		171		80		33		897

X^2 Test (N=897)
Age x E-government Adoption

	Value	**Df**	***P*(2-sided)**
Pearson X^2	62.610	3	<.001

Table 5.3 shows that from the adoption of e-government amongst the Egyptian citizens there is a decrease of e-government adoption with increase of age. The largest percentage (79%) of e-government adopters was between 18-30. In contrast, the older age groups from over 40 represent 7% were reported as very low for adopting e-government in Egypt. To verify if this result is significant or not, a chi-squared test was employed. The two hypotheses are stated as follow:

$H_{0:}$ No relationship between age and e-government adoption

$H_{1:}$ Some relationship between age and e-government adoption

This table also shows the observed (black)/ expected values (red) for each variable which was calculated according to following equation:

$$E- \frac{row\ total\ x\ column\ total}{grand\ total}$$

As **Table 5.3** demonstrates, there is statistical evidence to indicate that there are significant differences between adopters and non-adopters according to their age with a (x^2 (3, N=897) = 62.610. p<0.001). This might indicate that an association between the 2 variables is not attributed to randomness and is not similar to the expected results. Also a binary correlation test was performed to examine any association between the age of the respondents and e-government adoption. The following **Table (5.4)** shows that from the results obtained there was a negative correlation between the respondent's age and the citizen's adoption of e-government, hence the younger the age group the more willing they might be to adopt e-government services.

Table 5.4: Spearman's rho Correlations which show the association between Age and E-government Adopters		
		E-government Adoption
Age	Correlation	-0.252(**)
	Sig. (1-tailed)	.000
	N	897
** Correlation is significant		
at the 0.01 level		

Education

Table 5.5 illustrates that the majority of the adopters are educated to college degree (78.8%) followed by postgraduate (41%), finally the educational level of high school had lower level of adoption with (11.2%). There is an increase of e-government adoption with increase of Education. The two hypotheses are stated as follow:

$H_{0:}$ No relationship between Education and e-government adoption

$H_{1:}$ Some relationship between Education and e-government adoption

This table also shows the observed (black) / expected values (red) for each variable which was calculated according to following equation:

$$E- \frac{row\ total\ x\ column\ total}{grand\ total}$$

The Pearson's chi squared test validated that there was a significant difference between educational levels of adopters and non-adopters with a (x^2 (2, N=897) = 85.38. $p<0.001$).

Table 5.5: Education as a determinant of E-government adopters and Non-adopters							
Education	=< high school		College degree		Post graduate		**Total**
	Frequency	%	Frequency	%	Frequency	%	
Non-adopters	63	11.2	267	47.5	232	41.3	562
	(48)		(333)		(181)		
Adopters	14	4.2	264	78.8	57	17	335
	(29)		(198)		(108)		
Total	77		531		289		897

X^2 Test (N=897) Education x E-government Adoption					
	Value	**Df**			***P*(2-sided)**
Pearson X^2	85.318	2			<.001

Also a binary correlation test was performed to examine any association between the educational; level of the respondents and e-government adoption. The following **Table (5.6)** shows that from the results obtained, there was a significant positive correlation between the respondent's educational level and the citizen's adoption of e-government.

Table 5.6: Spearman's rho Correlations which show the association between Age and E-government Adopters		
		E-government Adoption
Age	Correlation	0.145(**)
	Sig. (1-tailed)	.000
	N	897
** Correlation is significant		
at the 0.01 level		

Public service Information

19.8% (N= 177) stated that they conduct transactions with the public sector less than 5 times annually, 33.5% (N=300) said that they conduct transactions between 5 to 10 times annually with public sector, while 27.8% (N= 250) of the respondents conduct transactions more than 20 times and 18.9% (N=170) of the respondents stated that they conduct the transactions with the public sector between 10 and 20 times annually. As

shown in **Figure 5.2** the majority of the respondents 80% use face to face to conduct transaction with the public sector followed by phone 60%, internet 36% and finally by using agent 15%,

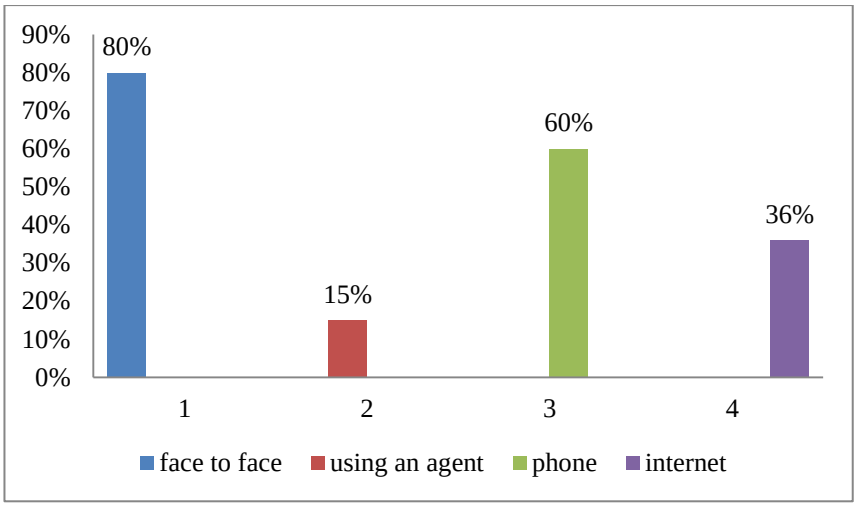


Figure 5.2: The way of conducting transaction with public sector

The majority of respondents stated that the common problems in conducting transactions with the public sector (face to face) are:

- Time consuming (e.g. too much paper work required, big response time to answer your request.
- Human error (e.g. wrong names in birth certificate).
- Cost money (e.g. bribe government workers to finish the requested papers.

The main objective here is to get a general idea about how people interact with the government, what problems are facing them in the face to face so the government can overcome these problems in the online services.

E-government experience

With regards to respondents' actual usage of governmental websites to obtain a service, 37% stated that they used or visited e-government services available on any government websites while 63% stated that they did not use it. They stated that the range of services

obtained from e-government websites included: Vehicle licensing, Visa renewal, Getting information, Paying phone bill, Extracting National ID, Extracting birth certificate and Reserving train tickets. As shown in **Figure 5.3**, almost half the respondents indicated that they have been using government websites for **about 1-2 years** (48%), followed by **more than 2 years** (36%), and **less than one year** (16%).

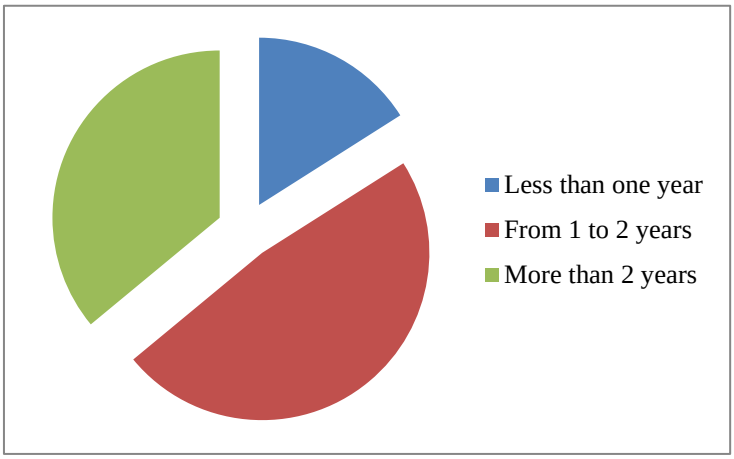


Figure 5.3: The period citizens have been using governmental websites

As shown in **Figure 5.4**, the common reasons for visiting governmental websites were **searching for information** (86.7%) followed by submitting **online application forms** (53.3%) **downloading documents** (44.4%) and finally **making payment online** (38%).

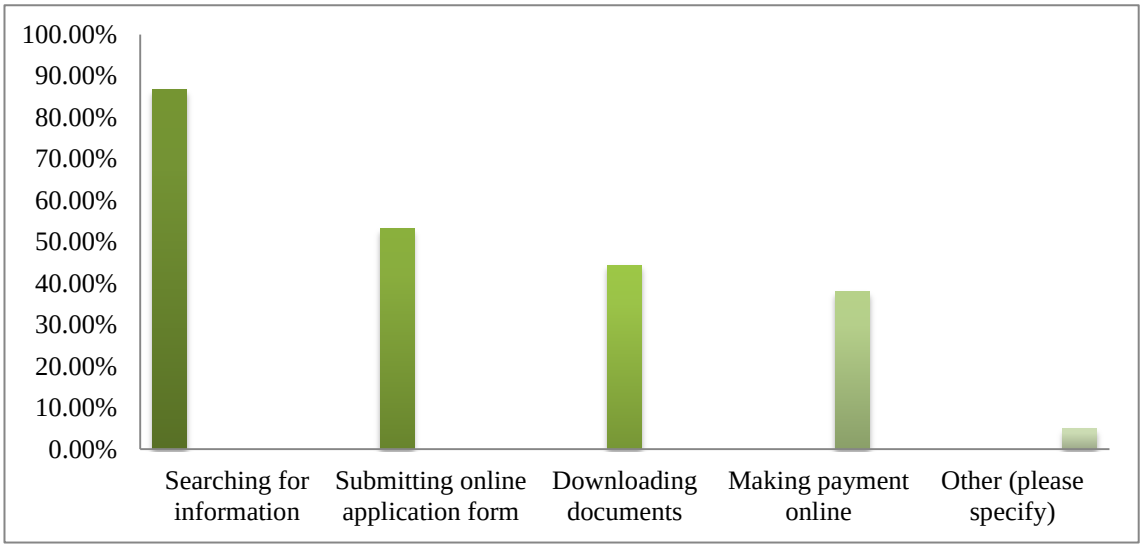


Figure 5.4: common reasons for visiting government websites

Barriers for e-government usage

As shown in **Table 5.1** page 113, it was found that 562 (63%) of the respondents indicated that they never used governmental websites (non-adopters). It was essential to investigate causes for not using e-government services, so they were asked about their reasons for not making use of such facilities. As shown in **Figure 5.5**, the majority of responses indicated that their main reason was **they didn't need them** (61%), followed by **preferring the personal interactions** (57%), **having negative attitude towards governmental website** (52%), **cost more money** (45%), **not knowing about the service offered** (33%), **don't trust the internet** (31.5%)and the other results as follow

The service that I want can only be done in person (e.g. obtaining ID card for first time).	29.5%
I believe that the government will not keep my best interest in mind while offering the service.	23%
It is very difficult to navigate through e-government services websites.	18%
I believe that there is no laws or regulations that protect my rights when dealing with government	12%
An online option for obtaining certain service (e.g. renewing driving license) was not available.	10%
The government website was too hard to use or understand.	8%
The government website does not have the information I want.	5%
I tried to use e-government website, but the site does not work	2%

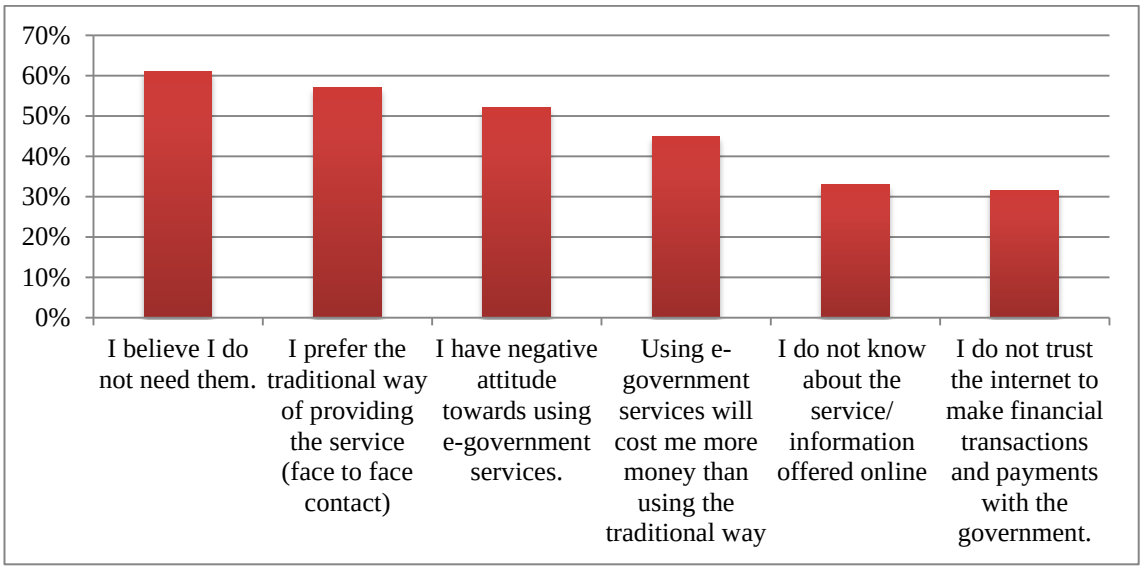


Figure 5.5: reasons for not using e-services on governmental websites

The objective of the previous sections was to understand the demographics characteristics of the sample chosen for this research, showing the difference between those people who adopt e-government (adopters) and those who do not use it (non-adopters) according to their age, gender and educational level. Also to understand how they conduct transactions with government, problems that face them while interacting face to face with government, for those who adopt e-government what are the services they use and for how long. Finally, for those who do not use e-government what are the reasons behind this.

5.4. Instrument validation

The purpose of this section is to report steps undertaken to test the questions related to the research model, which involved two main empirical tests: reliability to measure internal consistency, and factor analysis to assess the validity of scales.

5.4.1. Reliability

Hair et al. (2006), and Field (2009) explain that reliability refers to "whether an instrument can be interpreted constantly across different situations." Therefore, ***Reliability: the fact that a scale (question) should consistently reflect the construct (factor) it is measuring***.. (Sekaran, 2003). In statistical terms, the usual way to look at reliability is based on the idea that individual items (or sets of items) should produce results consistent with the overall questionnaire.

Cronbach's alpha is the most common measure of internal consistency ("reliability"). It is most commonly used when you have multiple Likert questions in a survey/questionnaire that form a scale and you wish to determine if the scale is reliable.

A review of the literature defines an acceptable level of internal reliability as a computed alpha coefficient that varies between a perfect internal reliability (1) and no

internal reliability (0). Other research findings have not presented overall agreement, and Hair et al. (1995) suggest 0.70 coefficients as good internal reliability, but Pallant (2001) argues that 0.60 coefficient is a good internal reliability. Four levels of reliability are suggested by Hinton et al. (2004), as low (0.50 and below), high moderate (0.50-0.70), high (0.70-0.90) and excellent (0.90 and above).

This research used the Cronbach alpha test to measure internal reliability. The reliability function in the SPSS was used to test the internal consistency for the items of each construct's measure in the survey. The result of reliability is shown in **Table 5.7**

Scales	No. of Items	Cronbach Alpha(∝)	Type
Perceived Usefulness (PU)	4	0.862	High Reliability
Perceived Ease Of Use (PEOU)	4	0.892	High Reliability
Attitude (ATT)	3	0.833	High Reliability
Behavioural Intension to Use (BI)	4	0.895	High Reliability
Trust Internet (TI)	3	0.925	Excellent Reliability
Trust Government (TG)	4	0.903	Excellent Reliability
Perceived Public Value (PPV)	4	0.905	Excellent Reliability
Website Design (WD)	6	0.928	Excellent Reliability
Total	32		

Table 5.7: Reliability test result

A high Cronbach‘s value for all constructs was found (0.833 to 0.932), implying that they are internally consistent and measure the same content of the construct with satisfactory reliability.

5.4.2. Factor analysis

Duplicated or redundant data may be removed from a set of correlated variables and these associated variables then represented by a group of derived variables by using a data reduction tool known as factor analysis. Bryman (2008) commented that factor analysis is "employed in relation to multiple-indicator measures to determine whether

groups of indicators tend to bunch together to form distinct cluster, referred to as factors". The factor analysis test is used to find that certain group of questions seems to cluster together, can be divided into two main categories: the exploratory factor analysis (EFA) (which is used in this research) which is used when a researcher wants to discover the number of factors influencing variables and to analyse which variables 'go together' (DeCoster, 1998). and the confirmatory factor analysis (CFA).

The statistical package SPSS was used to conduct factor analysis. **Table 5.8** shows the factor analysis that explains that all the items loaded properly in their expected factors. Headings of columns report the name of factors showing strong loading and headings of rows indicate the main items that are related to each factor .all of the items loaded properly. Factor loadings represent how much a factor explains a variable in factor analysis. Since each factor loading on each item was more than 0.50, therefore, the factor analysis results satisfied analysis. As you see in **Table 5.8** we have 32 items which represent 32 questions, in columns 8 factors which represent the variables in the model. The survey is designed to answer questions in 8 categories: PU, PEOU, ATU, BI, TI, TG, PV and WD. For each survey question, examine the highest (positive or negative) loadings to determine which factor affects that question the most. In the following table questions from PU1 to PU4 loaded on PU (factor1), questions PEOU1 to PEOU4 loaded on PEOU (factor2), questions ATU1 to ATU3 loaded on ATU (factor3), questions BI1 to BI4 loaded on BI (factor4), questions TI1 to TI3 loaded on TI (factor5), questions TG1 to TG4 loaded on TG (factor6), questions PV1 to PV4 loaded on PV (factor7) and question WD1 to WD6 loaded on WD (factor8). Loadings can range from -1 to 1. Loadings close to -1 or 1 indicate that the factor strongly affects the variable. Loadings close to zero indicate that the factor has a weak affect on the variable. Findings from both the reliability test and the factor analysis confirm internal consistency of measures and construct validity.

Table 5.8: Factor analysis

Rotated Factor Matrix								
Items	PU	PEOU	ATU	BI	TI	TG	PV	WD
PU1	.773							
PU2	.878							
PU3	.881							
PU4	.829							
PEOU1		.828						
PEOU2		.894						
PEOU3		.852						
PEOU4		.810						
ATU1			.895					
ATU2			.883					
ATU3			.832					
BI1				.826				
BI2				.828				
BI3				.801				
BI4				.795				
TI1					.908			
TI2					.929			
TI3					.906			
TG1						.879		
TG2						.801		
TG3						.799		
TG4						.854		
PV1							.807	
PV2							.865	
PV3							.794	
PV4							.859	
WD1								.826
WD2								.760
WD3								.829
WD4								.806
WD5								.843
WD6								.809
Extraction Method: Principle Component Analysis								
Rotation Method: Varimax and Kaiser Normalization								

PU: Perceived Usefulness - PEOU: Perceived Ease of Use – ATU: Attitude

BI: Behaviour Intention – TI: Trust in the Internet – TG: Trust in Government

PV: Perceived Public Value – WD: Website Design

5.5. Structural Model

The proposed framework was validated using Structural Equation Modelling (SEM) techniques; a popular method for model testing. It is defined by Byrne (2013) as "a statistical methodology that takes a confirmatory (i.e. hypothesis-testing) approach to the analysis of a structural theory bearing on some phenomenon". Li et al. (2012) tested measurement and research models using the structural equation modelling (SEM) technique, "which has been used in measuring user's acceptance of IT". It has been

applied in many IS studies (e.g. Wang and Liao, 2008; Urbach et al., 2010). Structural equations express hypotheses among variables that can be either unobserved variables (latent variables) or directly observed variables (manifest variables) (Udo et al., 2010).

5.5.1 Basic Concepts of Structural Equation Modelling

Kaplan (2000) describes SEM as, "a modelling of factor analysis and path analysis into one comprehensive statistical methodology". Indeed, the process of modelling consists of four main stages: specifying the model, estimating the model, evaluating the model, and modifying the model (Bollen, 2005).

To be knowledgeable about SEM, It is essential to understand two concepts: the measurement model and structural model (Holbert and Stephenson, 2002). The measurement model creates relationships between unobserved variables and observed items (Holbert and Stephenson, 2002). The structural model (which was used in this research) examines a set of hypothesized relationships between two or more variables (Holbert and Stephenson, 2002). Byrne (2013) stated that, the primary task in model testing when using SEM, "is to determine the goodness-of-fit between the hypothesized model and the sample data".

SEM allows for a set of relationships between one or more discrete/continuous Independent Variables (IVs), and one or more discrete/continuous Dependent Variables (DVs) (Bollen, 2005). These IVs and DVs can be either measured variables or factors (12 factors to investigate in the proposed model) (Bollen, 2005). From a statistical point of view, SEM is an extension of General Linear Modelling (GLM) procedures, such as multiple regression analysis and ANOVA (Lei and Wu, 2007). The goal of using SEM for analysis is to test a model, to test specific formulated hypotheses, to modify the examined model, or to examine a set of related models (Bollen, 2005) which is the reason for using SEM in this research.

The model argues for the credibility of relations between variables if the goodness of fit is adequate; if it is not, the relations among variables are rejected (Byrne, 2013). This is the goal of SEM to determine whether the hypothesized model reflects the underpinning theory when it is consistent with data collected (Lei and Wu, 2007).

As a summary, In this research, the proposed model is a complex model, which means that a variable can be dependent in a relationship and independent variable in another relationship so regression analysis cannot be used because it does not allow examining complex relationship. so SEM was used. Also to assess the goodness of fit of the whole model as stated before SEM has the capabilities to measure the goodness of fit while regression analysis doesn't have this technique.

5.5.2 Structural Equation Modelling Advantage

Advantages from 1 to 4 applies on this research

1. SEM can incorporate both observed variables and unobserved (i.e. latent) ones (Lei and Wu, 2007; Byrne, 2013).
2. SEM can be used to examine the relationships among latent constructs that are measured by multiple indicators (Lei and Wu, 2007). It tests the model statistically in a simultaneous analysis of the entire variables to find the extent to which the model is consistent with the data (Byrne, 2013). Bollen (2005) summarizes the advantages of using SEM thus:
3. When the phenomena under investigation are multidimensional and complex, SEM is considered the only statistical analysis tool that allows simultaneous and complete examinations of all the relationships. (Byrne, 2013)
4. SEM is capable of testing hypotheses with a model at a construct level. This is a distinct advantage that characterises SEM from other statistical analysis methods.

5. SEM can statistically compare different models to one another. Each of these models might represent a theory. Thus, SEM provides a strong examination for different theories (models).

5.5.3 Result of Structural Equation Modelling

To answer the research question of what are the factors affecting the adoption of e-government in Egypt,, the following proposed adoption model that includes the following constructs was tested using SEM to investigate the different effects of the variables on each other; Trust in government, Trust in the Internet, Website design, Perceived Public Values, Gender, Age and Educational level as external variables to the TAM model, with original variables of Perceived Usefulness, Perceived Ease of Use, Attitude, Behaviour Intention and Actual Use). The following sections will demonstrate in detail the results of the model analysis.

Model fit

The overall fit of the model was assessed using multiple model fit criteria, as suggested in the literature (Bollen, 1993; Hu, 1999), which was calculated using Amos. Seven goodness of fit indices were used, including:

- Chi-square (X^2)
- Degree of freedom/Chi-square (X^2/d.f)
- Comparative Fit Index (CFI)
- Normed Fit Index (NFI)
- Goodness-of-Fit Index (GFI)
- Adjusted Goodness-of-Fit Index (AGFI)
- Root Mean Square Error of Approximation (RMSEA).

The above model-fit indices are used with many studies on IS success research. According to Chiu et al. (2007), to have sufficiently good model fit for a model, the value of chi-squared should be more than 0.05, and the value of chi-squared divided by

degrees of freedom (X^2/df.) should not exceed 3. Comparative Fit Index (CFI) should be higher than 0.9, and Root Mean Square Error of Approximation (RMSEA) value should be less than 0.08. Anderson and Gerbing (1988) stated that, the value of RMSEA is acceptable if it is less than 0.1.

Table 5.9 shows the overall model fit indices which were calculated by AMOS software. It shows that all indices had clearly exceeded the ideal standard values that were suggested for a good model fit, which means that the model had reached an acceptable level and could be used to explain the hypotheses. Thus, the path coefficients for each individual hypothesis of the structural models were tested next.

Table 5.9: Model Fit indices for the research model

Fit Index	Recommended Value	Scores	Accepted fit?
X^2	p>0.05	0.839	Yes
X^2/df	< 3.00	1.386	Yes
GFI	>0.90	0.926	Yes
RMSEA	<0.08	0.000	Yes
RMSR	<0.08	0.061	Yes
AGFI	>0.90	0.935	Yes
NFI	>0.90	0.998	Yes
CFI	>0.90	1.000	Yes

Hypothesis tests for e-government adoption model

The test of structural model was performed using SEM. The test of the structural model includes: a) estimating the path coefficients β, which indicate the strengths of the relationships between the dependent variables and independent variables, and b) the R square value, which represents the amount of variance explained by the independent variables. The structural model reflecting the assumed linear, casual relationships among the constructs was tested with the data collected from the validated measures. **Table 5.10** and **Figure 5.6**, shows the results supported most of the hypotheses in the research model.

Table 5.10: Summary of hypotheses tests

Hypothesis	independent	dependent	Path	Path β Coefficients	P-Value	Results
H1	PU	ATT	PU→ATT	0.41***	0.000	Supported
H2	PEOU	ATT	PEOU → ATT	0.14**	0.005	Supported
H3	ATU	BI	ATU → BI	0.60***	0.000	Supported
H4	PEOU	PU	PEOU →PU	0.45***	0.000	Supported
H5	PU	BI	PU→BI	0.06	0.156	Not supported
H6	BI	EGAU	BI→EGAU	0.66***	0.000	Supported
H7	Age	PU	Age→PU	0.72	0.126	Not supported
H8	Age	PEOU	Age→PEOU	0.39	0.272	Not supported
H9	Gender	PU	Gender→PU	-0.57	0.567	Not supported
H10	Gender	PEOU	Gender→PEOU	0.25	0.796	Not supported
H11	Education	PU	Edu→PU	0.64	0.096	Not supported
H12	Education	PEOU	Edu→PEOU	0.54	0.144	Not supported
H13	TG	PU	TG→ PU	0.13**	0.005	Supported
H14	TG	PEOU	TG→PEOU	0.25**	0.005	Supported
H15	TI	PU	TI → PU	0.09*	0.021	Supported
H16	TI	PEOU	TI→ PEOU	0.26***	0.000	Supported
H17	WD	PU	WD→ PU	0.189**	0.005	Supported
H18	WD	PEOU	WD→ PEOU	0.203**	0.003	Supported
H19	PV	PU	PV→ PU	0.166***	0.000	Supported
H20	PV	PEOU	PV→ PEOU	0.21***	0.000	Supported
***P<0.001, **P<0.01, *P<0.05						

Interpretation of Path Coefficients β: First of all, they are not correlation coefficients. The importance of β is to identify the type of relationship between variables in the research model whether is it positive or negative. For example: β value for the path between TG and PU (H13) is equal to 0.13 which means if TG is increased by one standard deviation from its mean, PU would be expected to increase by 0.13 while holding all other factors constant.

Interpretation of P-Value: p-value helps to determine the significance of the hypothesis; it is a number between 0 and 1. The smaller the p-value, the larger the significance. If

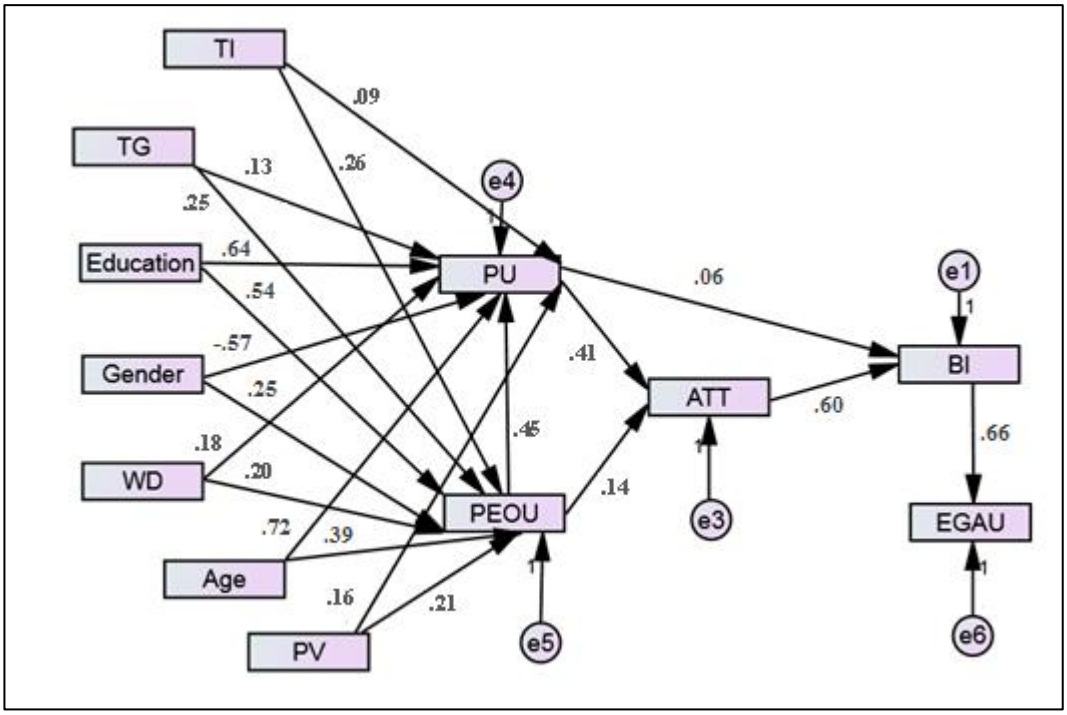
the value is less than 0.001 means strong significant effect, p-value is less than 0.01 and bigger than 0.001 means moderate significant effect between variables and if p-value is less that 0.05 and bigger than 0.01 means weak significant effect. If the value is bigger than 0.05, then the hypotheses is not supported.

Interpretation of result

To support or reject the hypothesis the p-value for each path is compared with the different significant levels which shown by * in the Path Coefficients β column (***P<0.001, **P<0.01, *P<0.05). If the p-values is under 0.001, or 0.01 or 0.05 then the hypothesis is supported and if the value bigger than 0.05 means the hypothesis is rejected.

Table 5.11: Squared multiple correlations of the research model (calculated only for the dependent variables only)

Construct	R^2
PU	64.8
PEOU	65.6
ATT	60.4
BI	74.9
EGAU	47.0



Note: The numbers on the figure represent Path Coefficients β. TI: Trust in Internet - TG: Trust in Government – WD: Website Design – PV: Perceived Public Value – PU: Perceived Usefulness – PEOU: Perceives Ease of Use – ATT: Attitude – BI: Behaviour Intention – EGAU:E-government Actual Use and error (e1 to e6) is the error associated with measured variable

Figure 5.6: Hypotheses testing results of e-government portals success model

Hypotheses testing of e-government portals success model reveal that only seven hypotheses out of twenty were NOT supported, that:

- Gender has an effect on perceived usefulness (H9) and perceived ease of use (H10)
- Age has an effect on perceived usefulness (H7) and perceived ease of use (H8)
- Education has an effect on perceived usefulness (H11) and perceived ease of use (H12)
- Perceived Usefulness has an effect on Behaviour I (H5).

Path Analysis

Perceived Usefulness had a strong positive significant effect on Attitude (H1, $\beta=0.41$, $p<0.001$), but no effect on BI (H5, $\beta= 0.06$, $p>0.05$). Perceived Ease of Use had a moderate positive significant effect on Attitude (H2, $\beta=0.14$, $p<0.01$) and a strong positive significant effect on Perceived Usefulness (H4, $\beta=0.45$, $p<0.001$). Behaviour

Intention had strong positive significant effect on Electronic Government Actual Use (H6, β=0.66, $p<0.001$).

Trust in Government had a strong positive significant effect on Perceived Usefulness (H13, β=0.13, $p<0.001$) and a moderate positive effect on Perceived Ease Of Use (H14, β=0.25, $p<0.01$), while Trust in the Internet had weak positive effect on Perceived Usefulness (H15, β=0.09, $p<0.05$) and a strong positive effect on Perceived Ease Of Use (H16, β=0.26, $p<0.001$).Website Design had moderate positive effect on both Perceived Usefulness (H17, β=0.189, $p<0.01$) and Perceived Ease of Use (H18, β=0.203, $p<0.01$). Public Value had significant strong positive effect on both Perceived Usefulness (H19, β=0.166, $p<0.001$) and Perceived Ease of Use (H20, β=0.21, $p<0.001$).

With regard to the variances of the constructs (R^2) (**Table 5.11**), Attitude explained 74% of the variance in Behaviour Intention. Trust in Internet, Trust in Government, Public Values, Perceived Ease of Use and Website Design explained 64.8% of Perceived Usefulness. Perceived Ease of Use had the strongest effect on Perceived Usefulness compared to the other factors. Trust in Internet, Trust in Government, Public Values, and Website Design explained 65.6% of the variance in Perceived Ease of Use. Trust in Internet had the strongest effect on Perceived Ease of Use compared to the other factors. Moreover, Perceived Ease of Use and Perceived Usefulness explained 60.4% of the variance in Attitude. Perceived Usefulness was found to be the strongest effect on Attitude. Lastly, Behaviour Intention explained 47.0% of Electronic Government Actual Use.

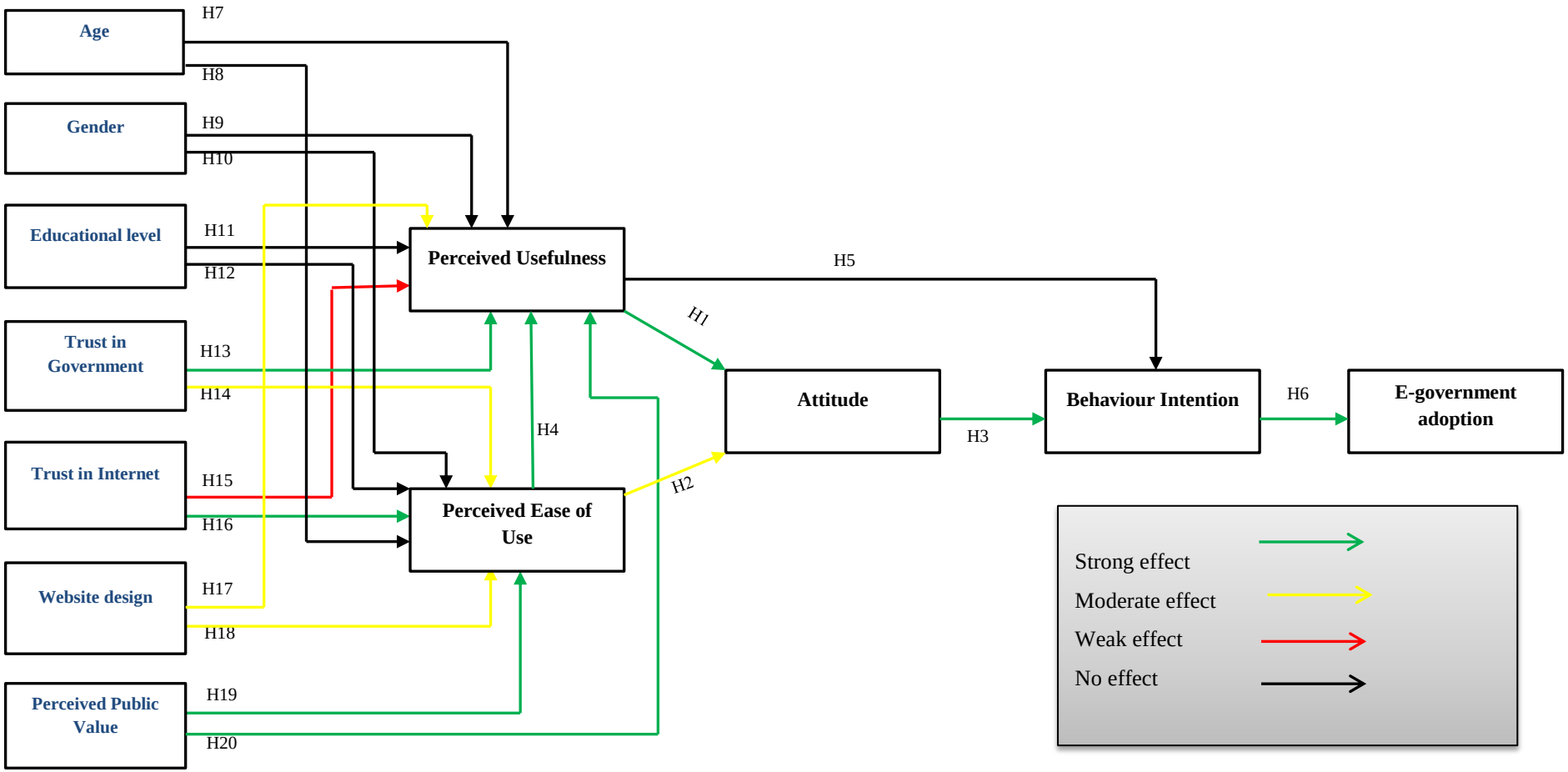


Figure 5.7: the analysed research model

The previous diagram shows the result of testing the hypotheses, which shows the p value results. As can be seen from the figure, H7 to H12 and H5 have no effect on the model, while the other hypotheses have an effect which varies from strong effect to weak effect.

5.6. Discussion

Having achieved the statistical analysis and produced the results, this section is dedicated to discussing the key factors that influence the e-government portals success. The accepted model fit indices of the model and the collected data, as well as conformations of the hypothesised relationships, indicate the validity of the proposed model, which identifies key factors that largely affect e-government adoption and explicate their causal relationships.

The following sub-sections address the key outcome of the empirical findings and discuss them in the light of previous studies together with the results of data analysis described in **Section 5.5**.

Findings from the Demographics Analyses

The demographic analysis helps to give a clearer picture of the characteristics of the data sate (sample chosen). This helps to deepen the understanding of the dataset, and also correlate it with other variables through other tests. As indicated in **section 5.3**, it was found that the percentage of males who make use of e-government in Egypt is more than females. Also the findings suggest that there is a relationship between gender and e-government adoption. The theoretical research on gender indicates that Arab men tend to be highly task oriented than females (Sulaiman et al., 2012); this research suggests the same. This finding can be explained from cultural perspectives, the cultural and social values in the Arab countries, to which Egypt belongs, are based on gender segregation. Compared to males, females in Arab world are subject to a stricter set of rules, which limit their interaction and communications.

As for age it was found that the majority for e-government adopters were from 18-30 age categories (43%) while (15%) from 50-60 age categories. This might indicate that the young citizens in Egypt have higher motivation to adopt e-government services than

older citizens due to being more technology savvy at a younger age. Also the findings suggest that age has a negative influence on e-government adoption behaviour. This means that people in the older age groups are less likely to adopt e-government, and a possible reason for this could be a lack of awareness about the probable benefits of e-government adoption, insufficient resources, and lack of skills and training.

For Education, the findings suggest that there was a significant positive correlation between the respondents 'education level and the e-government adoption. This can be explained by the fact that the e-government system is a utility tool for accessing government information and it is an effective system. Furthermore, highly educated citizens are more likely to have a higher level of education and occupation; hence, they may need an e-government system to conduct or complete any government service. So it could be concluded from the results that the higher the educations level, the higher the adoption of e-government in Egypt.

For the public service information, the results showed that the majority of respondents conducted transactions with the public service 5-10 times annually, preferring face to face interaction, also stating that time consumption, human error, and money cost are the problems they face while making the transactions with the public sector. So the government should focus on these problems, trying to solve them, convince people that using e-government services will eliminate these problems. For those respondents who indicated that they never used governmental websites (non-adopters), were asked about the reasons for not making use of such facilities. The majority of reasons given were: they didn't need them, followed by preferring the personal interactions**,** having negative attitude towards governmental website, cost more money**,** not knowing about the service offered, and didn't trust the Internet. So again the government should focus on these barriers and try to eliminate them to attract more people to use the e-services offered by

the government. For example: the cost for acquiring a birth certificate online is 25 pound while from the ministry itself it costs 5 pound only so the cost must be reduced.

E-government Adoption Model

This study demonstrates and validates a framework of e-government adoption Generally, the findings indicate that Website design, Perceived Public Value, Trust in Government, Trust in the Internet, Perceived Ease of Use, Perceived Usefulness, Attitude toward using e-government, Behaviour intention, E-government Actual use are valid measures of e-government adoption success. Apart from H5 (PU on BI), H7, H8, H9, H10, H11 and H12 (demographic factors), the other hypothesised relationships between variables were moderately or significantly supported (see **Figure 5.6**).

According to the previous result, the demographic factors (age, gender, and education level) which was proven to be not significant but they were proven before that are significant association between them and actual use of e-government, which means that the demographics should be tested other relationships with other factors in the TAM model in future .

Based on the previous empirical work; Perceived Ease of Use was confirmed as a variable affecting the adoption process through its multiple effects on key variables such as Perceived Usefulness and Attitude (H4, H2 tested previously). As far as citizens perceive that the use of e-government services is free of effort (easy to use) their Attitude and Perceived Usefulness are increased. A greater Perceived Ease of Use might create a more favourable atmosphere when using the service and should be a sign of the government concern about its citizens' needs. Therefore, the primary role of Perceived Ease of Use in the development of e-government services should not be underestimated and ease-of-use must still be a priority when designing these services. It is therefore a responsibility of the government to elaborate e-services based on users' requirements

and knowledge, in order to make them easy to use for the wide-range of citizens that exists in terms of Internet experience.

Also, organising free formation courses for those sectors of population with less knowledge about the Internet and adapting e-services to different devices such as mobile phones might be also useful to increase the Perceived Ease of Use of these services. This finding is also in line with earlier TAM research (Davis, 1989; Pavlou, 2003) and e-government adoption research (Phang et al, 2005; Wang, 2003; Wangpipatwong et al., 2008); however it has not previously been applied to Egypt.

Perceived Usefulness is revealed as the most important factor affecting citizens' attitude (H1) (directly) to adopt e-government services. It seems that, similar to other technology driven services, the perceived benefits derived from their use are the principal reason for citizens to adopt e-government services. Using e-Government system would improve users' performance and productivity. To the users, the degree to which the e-Government system is perceived to be useful strongly influences their attitude. If the e-Government system is perceived to be useful, the users form positive attitudes and strong intentions towards using the system.

They would find that the e-Government system is very useful, as it would enhance their effectiveness. Managers in charge of the online provision of public services should take into account that potential users have to perceive the usefulness of the service in order to adopt it. As a result, the Public Administration should carry out campaigns to promote the benefits of e-government services in order to enhance the perception of a worthy service (for example, in terms of time and cost saving, convenience, effectiveness, etc.). These findings are consistent with previous TAM research that test and validate the consistent relationships between perceived usefulness, perceived ease of use and attitude (Davis, 1989; Chang et al., 2005; Venkatesh and Davis, 2000; Yang,

2005). The results also showed that perceived usefulness had a stronger impact on attitude than perceived ease of use. This finding is also in accordance with earlier TAM research that consistently found that perceived usefulness was a more powerful predictor than perceived ease of use (Davis, 1989; Fu et al., 2006; Horst et al., 2007).

Attitude had a significant positive effect on Intention to use e-government services (H3). The findings demonstrated that citizens' intention to use e-government services is most dominantly influenced by their attitude towards using these services and less so by perceived usefulness. This indicates that attitude is a powerful mediator between beliefs (perceived usefulness and perceived ease of use) and intention to use e-government services (Heijden, 2003). However, prior research has suggested that the inclusion of attitude is not meaningful (Davis et al., 1989; Taylor and Todd, 1995; Venkatesh and Davis, 2000). This is justified by Davis and Venkatesh (1996) as "in work settings, people may use a technology even if they do not have a positive attitude (affect) towards using the same because it may provide productivity enhancement". In contrast, this research suggests otherwise, due to the voluntary nature of citizens' adoption of e-government services. Voluntary users formed their intentions to use the systems mostly based on their attitude toward using the system. .This result confirm the importance of Attitude in the TAM model, as this variable was removed from other version of TAM model which is new contribution added by this research

Behavioural intention was found to have a significant positive effect on individuals' actual use of e-government portals (H20). This result actually coincides with previous studies found in the technology acceptance literature. TAM originally hypothesises that, actual systems' use is directly determined by behavioural intention to re-use (Davis et al., 1989; Lee, 2009). In the context of e-government learning, Shyu and Huang (2011) found that a behavioural intention to re-use is a significant determinant of the actual usage. E-Government learning refers to the use of web-based technologies by

governments to facilitate learning about relatively new subjects, which are relevant to citizens (Shyu and Huang, 2011). This finding is consistent with Lin et al.'s (2011) study, which was conducted in the context of e-government in Gambia. Lin et al. (2011) stated, "[A] citizen's actual use of e-government system was influenced by their behavioural intentions to use".

Inconsistent with the proposition of the original TAM, this study found that PU did not directly affect citizens' intention to use e-government services (H5), but it directly affects their attitude, which means that Attitude construct fully mediates the effect of perceived usefulness on behavioural intention. The more useful the e-government website, the more the person feel good about the idea of using the e-government services, which will increase the intention to use this service. However this result is inconsistent with another test that found that attitude did not fully mediate PU, which other studies confirmed and ''TAM was refined to exclude attitude from it" (Venkatesh , 1999). This result proves the importance of Attitude in the TAM model. So managers promoting the digital channels use for public services should carry out campaigns and citizens try outs in order to make the advantages of e-government services noticeable and raise a favourable attitude toward the use among citizens.

From the previous discussion, we can conclude that The similarities between this research result with other results made by other researchers concerning TAM variables proves the strength of TAM model variables in addressing the e-government adoption. This research contribute in this area by proving the importance of Attitude existence in the TAM model which contradict other researcher result, and suggesting the removing the relationship between Perceived usefulness and Behaviour intention to use e-government.

Model External Variables

Trust in E-government is considered as the degree to which users of e-Government possess attitudinal confidence of the reliability, credibility, safety and integrity of e-Government. This is from the standpoints of technical, organisational, social and political factors as well as from the effectiveness, efficiencies, promptness and sympathetic customer service response's standpoints (Abdulghader et al., 2011). In the present study, trust in e-Government comprised of two dimensions, namely trust in government (H13, H14) and trust in Internet technology (H15, H16). All these hypotheses were supported.

H15 was found to be low significant which can be explained by that usefulness doesn't necessarily need trust in transactions, since usefulness of the internet can be entertainment nit just trusted information. High levels of Trust in government, and Trust in Internet would directly predict a higher level of users' belief in using e-government system, which means if the e-government services are not trustworthy, there is no reason why the citizens should anticipate getting any usefulness from using them. Also trust makes using e-government services less strenuous, by reducing the need for checking every detail related to security and privacy, which means increasing the adoption rate in Egypt. The government in Egypt lacks collaboration between its entities to draft laws and regulations related to ICT Usage, standardizing system use, and sharing information (according to interview results explained in the consequent chapter). These issues should be considered by the government in Egypt in order to increase citizens' trust and have them more willing to use government websites. Governmental e-services should strongly consider the characteristics of the online environment and employ a trusted quality system of service management (Corbitt et al., 2003) combined with other techniques that could improve the perception of a trustworthy e-government service by citizens.

Perceived Public Value (H19, H20) which is considered the consumer's overall assessment of the utility of a product based on the perceptions of what is received, and what is given, had a significant effect on users beliefs (Perceived usefulness, and Perceived Ease of Use). Higher level of Perceived Public Value, would predict higher level of users beliefs about using e-government system. Findings of this study indicated that perceived public value had significant impact on Perceived Usefulness (B =0.172, $p<0.001$), which is positive and significant, which in turn influences citizens' attitude to adopt e-government services. Similarly, the results also showed that Perceived Public Value had significant impacts on Perceived Ease of Use, which also in turn influences citizens' attitude to adopt e-government services (B= 0.215, $p<0.001$). Government must concentrate on how to increase the value for the public from using e-government services in order to attract more people to use their online services; also e-government strategy must pay more attention to the requirements and expectations of users in developing e-government services. For example government must focus on the quality of the services offered and that can be measured by the availability of information, also focus on campaigns to make them aware of the different values of the services, citizen's perceptions about the importance of the information, availability of multiple channels for citizens to access public services, cost and time savings, fairness of the services delivery, and citizens' satisfaction on e-government service delivery.

Website Design was proved to be a significant predictor to the users' beliefs (Perceived Usefulness with positive beta and significant B= .191 $p< 0.01$, and Perceived Ease of Use with positive and also significant B= 0.143, $p<0.01$). Citizens' beliefs (Perceived Usefulness, Perceived Ease of Use) to adopt e-government increases if e-government websites are available with adequate, attractive and well-organised design and content. Any government tends to have an online presence on the web such as having an online presentation of government information to meet the citizen's demands. The

government in Egypt is one of the governments that have started to have an online presence by using websites as the main medium through which to launch its services and information. Therefore, government agencies in Egypt should ensure that their websites are accessible to different users. Improving citizens' accessibility to government services and information to increase government transparency is one of the main e-government objectives (MCIT, 2004). The government in Egypt therefore should ensure that their websites are available with consistent and attractive screen layout. Also, the links on the websites should be updated as they should not lead to deleted or re-directed pages. Ensuring that people are comfortable in interacting with the government via the web-based channel could enable the government to move and think about the other electronic based channels such as Mobile government services. Consequently, having a variety of electronic channels for launching government services to the citizens will assist the government to increase people's accessibility to the government information and services provided through the website and therefore have them more informational and technologically knowledgeable. Moreover, the non-standardised designs of e-government websites might hinder their navigation. No less important, the lack of a standard design of websites for either the ministries or other entities of government (MCIT, 2004) may be a consequence of the lack of citizen centricity in implementing e-government. Therefore, having a non-standard design for the government entities' online services will lead people to view the websites in different ways. Therefore, the different designs might be undesirable for most people when they need to navigate the different websites to conduct different transactions. The website should be accessible for people with disabilities e.g. hearing aids for the visually impaired and monochrome design options for colour blind, large button links for motor impairment, images for illiterate, explanations of terms etc. This study

therefore confirms website design as one of the factors that affect e-government adoption by Egyptian users.

5.7. Summary

The main purpose of this chapter was to provide the empirical test of the proposed model for understanding the factors affecting the adoption of e-government. The e-government adoption model proposed in this study consists of twelve constructs: gender, age, education, trust (government, internet), perceived public value, and website design as external variables to TAM model which consist of PU, PEOU, ATT, BI, and EGAU.

> What are the factors that influence the citizens' acceptance and adoption of e-government services in Egypt?
>
> What is the relative importance of these factors and the relationship between them?

The research sub questions (2 and 3) were answered by proving that the research model is a good fit model that represents the model of e-government adoption in Egypt. The result also address the both contribution to knowledge. And also address the following objectives: Understand the factors affecting the citizen adoption from managerial perspectives, develop and test a new adoption model for e-government in Egypt and explore the importance of each factor in the model. This chapter reported the results of initial data preparation, and the demographic analysis of survey data. The analysis of the data collected from this study produced evidence of significant differences between e-government adopters and non-adopters. It also reported steps undertaken to test the instrument, which involved two main empirical tests: reliability to measure internal consistency; and factor analysis to assess the validity of scales.

Results of testing the reliability of scales showed that the internal reliability values for all the scales are in the acceptable range. The factor analysis provided evidence that all

items have satisfactory loading values (i.e. greater than 0.4). This means that the collected data and the findings that were obtained from this instrument are valid and reliable.

The findings of hypothesis testing suggested that EGAU is influenced by BI, which is influenced only by ATT which is different from what TAM assumption that behaviour intention is affected by both Attitude and Perceived Usefulness, which will lead us to the importance of Attitude factor in TAM model which proves the reason for usage of the TAM Model. ATT is influenced by both PU and PEOU. TI, TG, PV, WD constructs directly influence both PU and PEOU. However Demographic factors (age, gender and education) had no influence on PU and PEOU but according to the Chi-square test and Binary correlation test, there was association between the demographic variables and e-government adoption, and that future research will investigate whether demographics directly affect the other factors hence causing the association with e-government adoption. Also the hypotheses of the demographic variables were rejected so demographics should be investigated with other factors (e.g. the other external variables like website design, trust etc.) in future Finally a disussion of the main findings from quantitative analysis was presented. The 4th sub research question and addressing the second contribution to knowledge with the rest of objectives will be answered in the next chapter "Qualitative data analysis with the discussion".

6. Qualitative Analysis and Discussion

6.1. Introduction

Qualitative research is especially effective in obtaining culturally specific information about the values, opinions, behaviours, and social contexts in particular populations. It also is a means of research about people's lives, lived experiences, as well as about organisational functioning, social movements, cultural phenomenon and interactions between nations (Strauss, Corbin, 1998). The main aim for conducting interviews within this research was to understand the situation of e-government in Egypt, in terms of challenges that face the implementation of e-government by finding the relation between these issues from the managerial point of views and customer point of view. Another aim was to find common relationships on technology acceptance factors between the survey results and interviews results. Therefore, the research question is tackled in a constructive manner.

Interviewing as a research method is very widely used in social research and there are three different types of it. These are structured, semi-structured and unstructured interviews, which depend on the depth and extent of the response sought (Robson, 2002). Semi structured interviews (which allow the interviewee or participant much more flexibility of response) were conducted in this research. The analysis of semi-structured interviews conducted with key e-government officials in Egypt, as they are the people who are responsible for e-government planning, development and management in Egypt and with the Egyptian citizens will be presented in the following sections. The following diagram shows the outline of this chapter

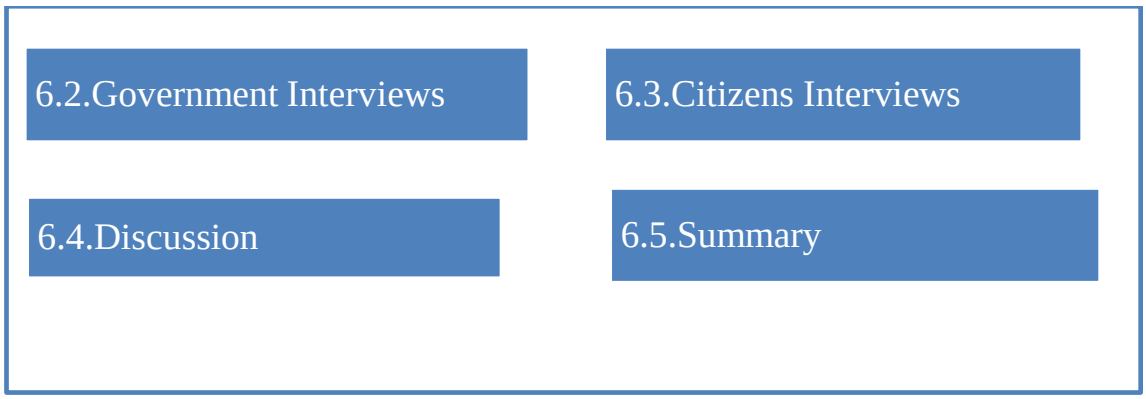


Figure 6.1: Chapter Outline

6.2. Government Interviews

6.2.1. Background

The Ministry of Communication and Information Technology (MCIT) was established in 1999. The main aim of it is to guide Egypt's transformation into a knowledge based economy that contributes to the socio- economic development. MCIT is the policy maker of ICT in Egypt. It was also assigned to take the lead role in implementing the e-government program in Egypt. Therefore, the e-government Program Management Office (PMO) was established to manage, facilitate and co-implement e-government. **Figure 6.2** illustrates the organisation charts for MCIT, including the e-government program. It also shows the positions of the e-government officials who were interviewed.

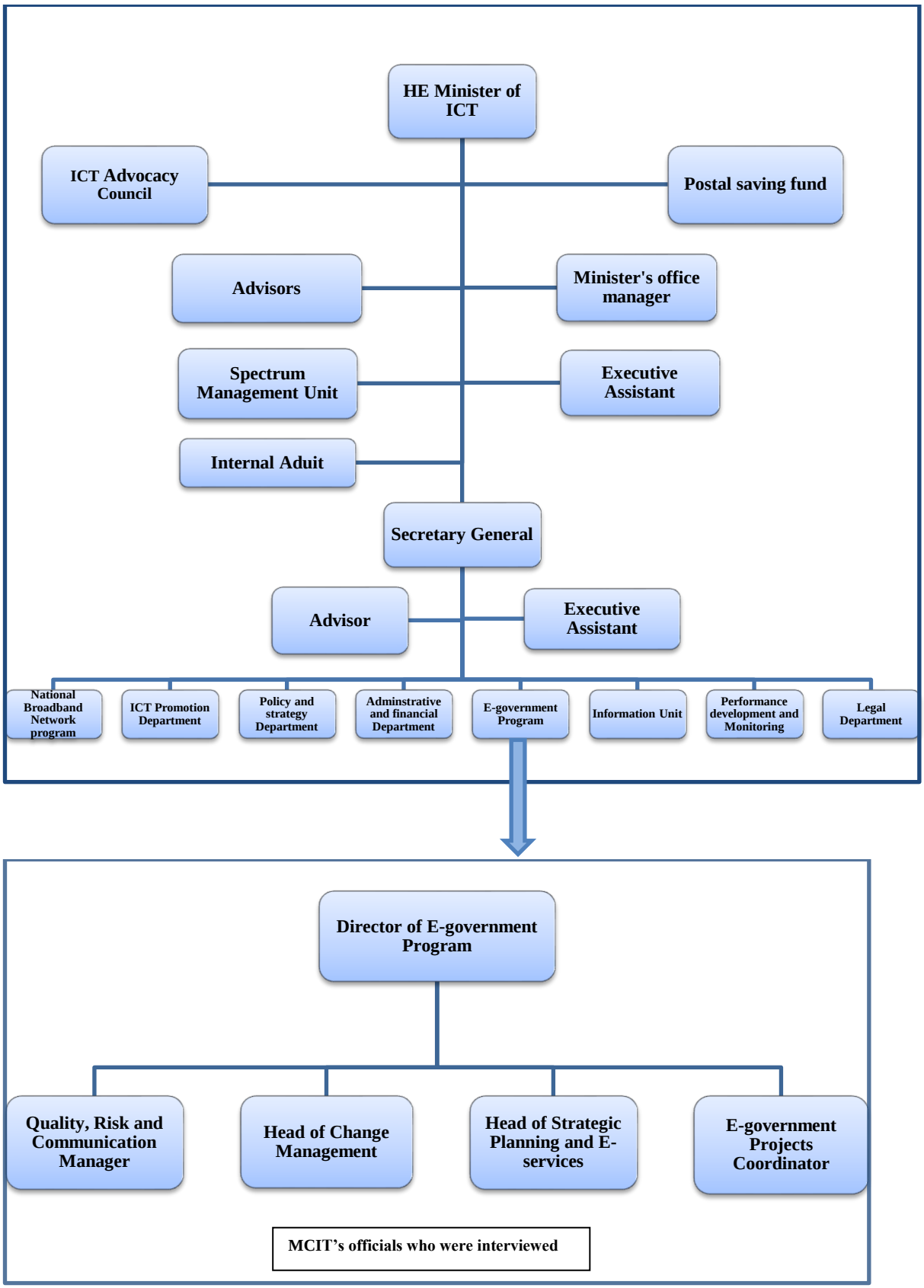


Figure 6.2: Organisation chart of MCIT. Source: adopted from (http://www.mcit.gov.eg)

The National Information Technology Centre (NITC) was also established as an independent government organisation managed by a board of directors chaired by the Minister of the Ministry of Communication and Information Technology. NITC is the executive authority for all policies and strategies related to ICT in the public sector. It is accountable for the deployment of all ICT resources. NITC is also responsible for monitoring the compliance of e-government programs with e-government standards and policies, and evaluating the performance of e-government efforts. For these reasons, the director of e-operations at NITC was interviewed. The first meeting was informal with the Deputy Minster. The purpose of the research was explained, along with the reasons behind conducting the interviews. The researcher was supported by many documents including: A formal letter from the Faculty of Management and Technology, Arab Academy (Alexandria branch) in Egypt confirming the researcher's work as assistant lecturer, a copy of the interview questions (in both Arabic and English), and an outline of the research, its aim and objectives. Also their verbal consent was taken by before starting the interview with them

6.2.2. Interview data analysis

As was mentioned and explained in the method chapter content analysis was used to analyse the qualitative analysis. The information obtained from each interview was analysed separately where each interview was first broken down into themes. Those major themes were:

- The interviewee's views about major challenges encountered either before or during the implementation of e-government services in various aspects and their opinions on how to overcome these challenges.
- The interviewee's views about major factors affecting the citizen adoption of e-government services and how to act towards those factors.

According to those themes, meanings were assigned to the descriptive information compiled during the interviews and codes were created. Those codes were attached to words, phrases, or sometimes whole paragraphs.

By reviewing written data and attaching codes to them, more codes were generated and the free list of codes started to grow; that procedure is called first level coding. For example the Quality, Risk and Communication Manager, and the Head of Change Management talked about legal and Policy Issues. Each time they mentioned legal and Policy Issues or something related to it, the researcher highlighted it. Legal and Policy Issues then became a concept, and other sub-topics related to it (e.g having draft regulations and laws) became categories. So it is Theme → Concept → Categories

Then the codes resulting from the previous step were grouped into themes to help in describing the features of the data. **Table 6.1**, shows the codes assigned to tree nodes, which represent the themes representing e-government in Egypt.

Table 6.1: Free nodes assigned to tree nodes representing e-government in Egypt

Tree Nodes (Theme)	Sub-Tree Nodes (Concept)	Free Nodes (categories)
Main challenges facing e-government	**Change management**	Change citizens' minds [culture] to accept the e-services
		Change the government's mind [organization culture toward online services]
		Re-engineering the business processes
		Resistance to change [from top and intermediate management]
	Financial issues	Egypt is not an oil country. Therefore, financial issues are a challenge
	Infrastructure constraints	Low internet penetration rate
		System integration
	Legal and policy issues	Need for a comprehensive legal framework
		Involvement of different parties
		Takes a long time
		We have draft regulations and laws
	Projects Management issues	Quality assurance
		Risk management
		The process of delivering projects is complicated and time consuming
	Public organizational issues	Communication problems
		E-readiness [important for e-government success]
		Government bureaucratic system

		Public sector reform [slow]
Factors affect the citizens' adoption		Citizens' awareness
		Information security and citizens' privacy
		Perceived benefits
		Trust
		Culture
		ICT-Literacy
		Ease of use
	Digital divide	Services need to be accessible
		Economic status
		Education
		ICT ability
		Geographical location
		Age
	Service quality	Accurate and up-to-date information
		Reliability
		Response

6.2.3. Qualitative Data Analysis with NVivo

Qualitative computing has become widely accepted, even required, and packages have become more sophisticated (Richards, 1999). The software used in this research is widely regarded as offering a new stage in software development. QSR NVivo (Qualitative Data Analysis Software) supports new projects' structures and new research processes (Bazeley and Richards, 2000).

In this research, records were built up from interviews, and field notes. These records also came in different forms (text and tape recordings). This was normal due to the qualitative nature of this research. As a result, NVivo was used as it provided a range of tools for handling such data records (Bazeley, 2007). Due to the large amount of the data that needed to be analysed, the coding process for the interviews was done using NVivo as it follows a systematic approach to analyse and reduce the vast amount of data. The software was used to code the data visually and in categories. Using the data reduction technique available within NVivo, the outcomes of the data have been illustrated in 2 models, which help in explaining the findings.

6.2.4. Data interpretation- bringing it all together

At this stage, themes and connections were used to develop a list of key points and important findings, which have been discovered as a result of categorisation and sorting of the data. The following sub-sections provide a presentation, and brief discussion about these key points and findings.

- **Challenges facing e-government implementation and adoption**

Despite the progress that has been made, a number of challenges were encountered at the different stages of the e-government program. Based on the interviews with e-government officials, the following are the main challenges of e-government implementation in Egypt (illustrated in **Figure 6.3**):

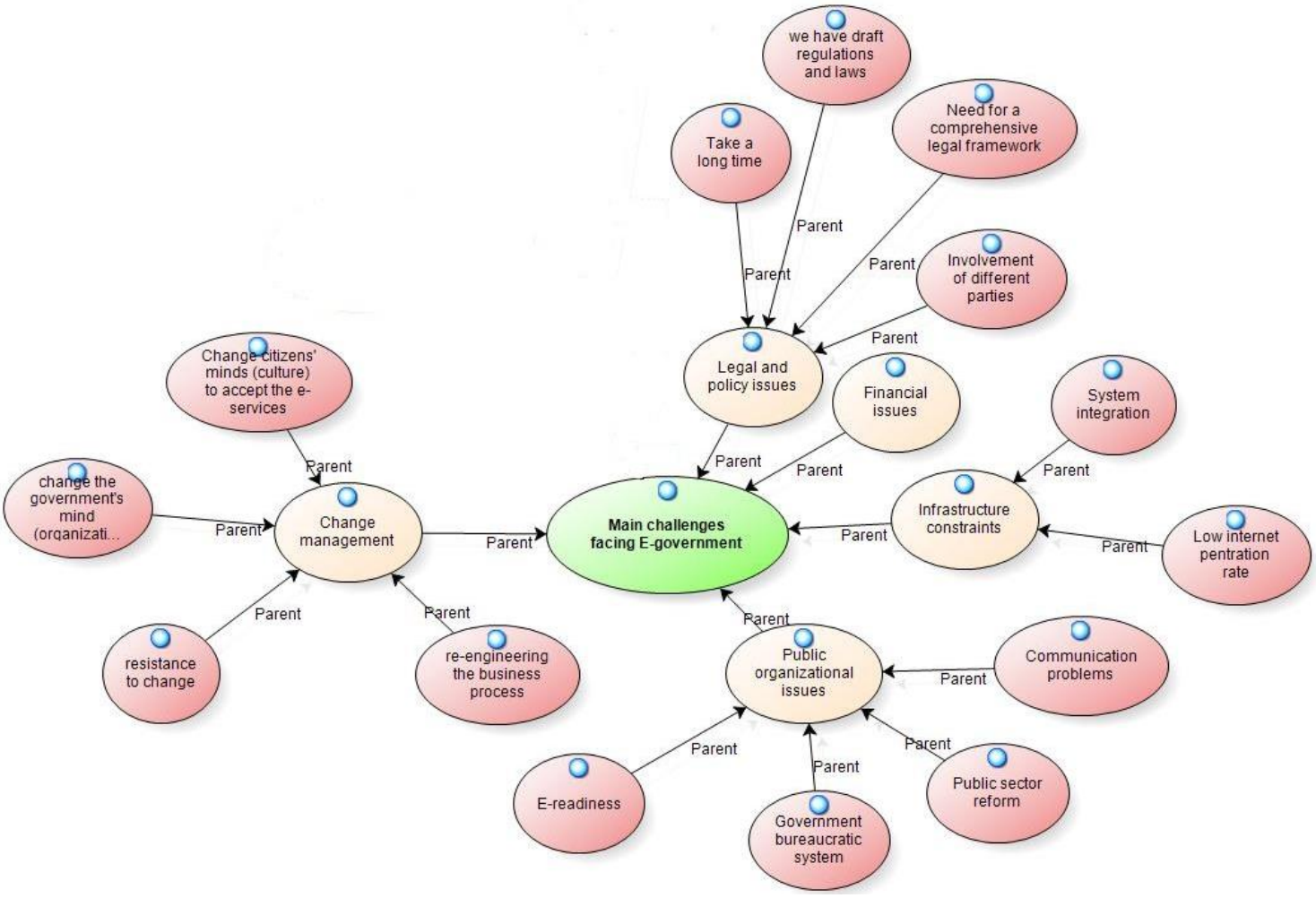


Figure 6.3: NVivo model for Egypt's e-government main challenges

Infrastructure constraints

ICT infrastructure is one of the major challenges facing e-government implementation in Egypt. According to the Head of Strategic planning and E-services, the Internet penetration rate in Egypt was 11.4%. This low percentage was attributed to inadequacy of bandwidth, ICT literacy, and limited affordability associated with personal computers and Internet connection costs. The Director of E-operations at NITC mentioned systems integration, besides the low internet penetration rate, as technical challenges. He stated:

> "*Technical issues such as systems integration, Internet penetration rate and computer experience are a real challenge for us. The cost of accessing the Internet is relatively high".*

However, there were some ideas presented by interviewees to increase the penetration rate of personal computers and Internet. The MCIT plain to supply personal computers to citizens at affordable prices. Regarding to this issue, the Head of Change Management stated:

> "*MCIT is working on that by introducing some initiatives such as the PC to every citizen initiative. In addition, MCIT has plans to increase Internet and PC penetration rates not only in the main cities, but also in the rural regions. This is one of the main responsibilities of MCIT".*

In addition to these ideas, MCIT established 3 communication companies around the country to provide better Internet connection at affordable prices. Those companies established many stations and offices. The Director of E-operations at NITC highlighted this point:

> "*The cost of accessing the Internet is relatively high, for this reasons the idea of creating stations around the country was introduced to provide internet to citizens at affordable price. Also we are planning to provide training on using computers and the Internet for both government employees and citizens".*

But these companies until now failed to provide good internet connection with affordable price

Furthermore, MCIT is planning to provide alternative access channels such as mobiles, centres to the already web based channels, to deliver e-government services to the public in order to utilise the high penetration of such channels. The E-government Project coordinator said in this context:

> *"Internet penetration rate is very low. Therefore, we are planning to use other service channels such as mobiles, because the widespread of the mobile among the citizens is very high. And also a part of the MCIT policy is to increase the internet penetration rate by decreasing prices and fees of the internet".*

Legal and policy issues

Delivering e-government services demands a range of new policies, law and regulations to deal with electronic activities. Despite the progress that has been made, interviewees highlighted the need for new policies, laws and regulations (e.g. electronic signature laws) as well as further evolution for the existing guidelines. This challenge was shown to be important to the citizens, as the results from the research questionnaire showed that 12% of the respondents stated that the absence of laws and regulations that protect citizens right, is one of the reasons for not using the government electronic services. So the government needs to set new polices, regulations, and laws to deal with e-services to secure any transaction citizens can make online with the government. Regarding these issues, the Quality, Risk and Communication Manager stated:

> *"Now we have draft regulations and laws related to e-transactions and security, waiting for the final approval from the relevant entities. However, as you know, this is a time consuming process and always a source of concern for us".*

The Head of Change Management also highlighted this issue:

> *"Before the development of any e-government service, we are responsible for simplifying and re-engineering the business processes of this service. As you know, sometimes this requires changing the existing laws and regulations. This is, however, a real challenge for us it takes a long time, and needs the involvement of different parties".*

Change Management

Implementing e-government introduces new channels of providing and processing governmental services. Therefore, interviewees agreed on the importance of proper change management during the transition process. However, this requires creating awareness among e-government stockholders to get familiar with this new shift. The Head of Change Management pointed out this issue:

> *"The idea of change management in the area of e-government is to help the government get familiar with the new changes which are associated with the implementation of e-government services. However, when introducing new channels to provide e-services, we need to help those stakeholders to get familiar with the new situation which requires creating awareness among them about e-services".*

For the citizens, there was resistance to change towards using new ways for delivering the government services, rather than the traditional Face-to-Face communication method. This point was supported by the questionnaire results, as 80% of the respondents preferred the Face-to-Face method in conducting any transaction with the government. Also the respondents in the questionnaire stated that they face the following problems: Time Consuming activities, Human Error, and great Costs when they interact face to face with the government. So to overcome this challenge, the Egyptian government needs to create awareness among citizens to convince them that using the internet as another source for obtaining services from the government will give more value such as saving time, saving money and accuracy. This can be done by running advertising campaigns in order to change citizens' attitudes.

The E-government Projects coordinator also commented on the following issue:

> *"We are dealing with different levels of citizens, and the change management is involved. The readiness of the government organisation for the new way of delivering services is very important. Therefore, the role of change management is to change citizens' mind to accept the e-services. At the same time to change the governments mind itself by changing the existing procedures and policies".*

According to the Head of Change Management, one of the important issues in the change management domain is the resistance to change from some government employees. They assume that ICT would replace them and therefore increase the possibility of losing their jobs. Government needs to train those people to use the new technology, and to convince them with the idea that interacting with computers is more efficient than interacting directly with the citizens who are requesting the services, which will minimise the problems of face-to-face interaction. And for the employees who do not want to adapt with the new ways, government should find a replacement job for them.

Public Organisation Issues

According to the interviewees, the ultimate goal of the e-government program in Egypt is to provide the public with service-oriented and customer centric e-services. However, the achievement of this goal will be impossible without public sector enhancing by smooth communication between government organisations, cutting the red-tape, e-readiness, strong inter-agency coordination, and encouraging delegation methods to middle management.

The Quality, Risk and Communication Manager drew attention to these issues:

> *"The government bureaucratic system is the main challenge for e-government development. For example, in case of any problem, I can't take the decision without reporting to the manager and the manager needs to report to upper level and so on. This, however, takes effort and time and certainly affects the e-government development. But, we are working now at all levels of management to make things easier".*

For the coordination and communication difficulties, the Quality, Risk and Communication Manager said:

> *"In several cases, we found difficulties to arrange meetings with other officials from the other government ministries and organisations to discuss issues regarding the e-government project. It takes extra time and efforts from our team".*

The e-government Project coordinator highlighted the E-readiness:

> *"The readiness of the government organisation for the new way of delivering services is very important. Therefore, when some organisations are not ready for e-government, this creates big challenge for us".*

Financial Issues

There were contradictions regarding the results obtained from the interviewees. The Director of E-operations pointed out the financial issues as one of the challenges for e-government program in Egypt, while the Quality, Risk and communication Manager disagrees with this point of view. He said:

> *"We don't have any financial problems now. According to the directions of our minister, we postponed some unnecessary projects to later stages and, therefore, we re-allocated the budget of these projects to other projects with high priority at this stage. We are not facing any financial problems at this stage. This year, I can tell that we have extra money".*

To overcome this challenge, the government must prioritise e-government projects in their annual budget plan and also by finding sponsors in the private sectors through advertisement campaigns on its sites.

- **Factors affecting the citizens' adoption of e-government**

The interviewees reported several factors affecting the citizens' adoption of e-government services in Egypt. These factors can be classified as shown in Figure 6.4:

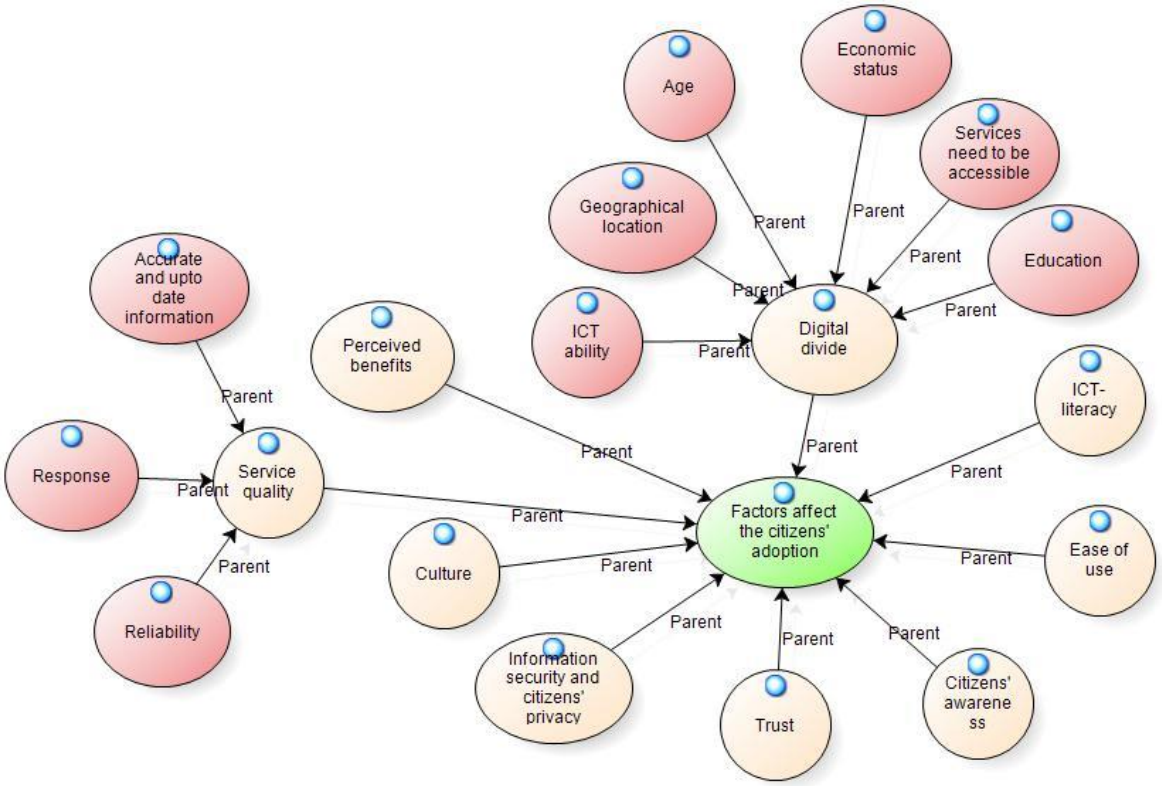


Figure 6.4: NVivo model for factors that affect citizens' adoption of e-government

Trust

According to the interviewee, citizens' trust is considered as one of the main factors that affect their willingness to use e-government services. The lack of trust is considered as one of the main barriers to e-government adoption in Egypt. Therefore, increasing citizens' trust in e-government services is viewed by the interviewees as a vital factor to increase the rate of e-government adoption. The results from the analysis of the questionnaire provide evidence this point too. First, 31.5% of the respondents claim that one of the reasons for not using e-government is not trusting internet to make any transaction with the government. Second, Trust (as trust in government and trust in the internet) was shown to be significant factors in the proposed Technology acceptance model. The E-government Project Coordinator stated:

> *"We need also to build the trust in these services, especially when the citizen is required to pay over the Internet. Therefore, it's very important to ensure that the online payment system is secure, and in case of any problem he will not lose his money"*

In order to increase citizen's trust, the government is required to make its e-services trustworthy by implementing information security and privacy policies on the government websites; providing reliable e-services; drafting and implementing related laws and regulations; transparency; advertising campaigns to raise awareness of safety internet procedures applied; and ensuring that citizens' queries will be adequately and quickly answered, which will positively increase the adoption of e-government. In this regard, The E-government Project Coordinator also stated:

> *"We build the trust by providing e-government services through secure network. We believe that security is very important to increase citizens' trust in e-government services. Also, it is important to be truthful when promising to offer new e-government services to citizens. If citizens get these services as we promised them. This will increase their trust. Moreover, transparency is essential to boost citizen's trust".*

ICT Literacy

The lack of ICT-literacy limits the use of e-government services by the public. By analysing the questionnaire, evidence was provided that website design is a significant factor in the adoption of e-government, which means that the website designer should take into account while designing the government portal that the percentage of illiteracy is very high, especially in the rural cities, and hence maybe add other communication means such as symbols or images or audio options. The Head of Strategic Planning and E-services stated:

> *"The lack of IT skills among significant portions of the citizens is a real concern for us. Therefore the website designer for the e-government portal must take this concern in their consideration while designing the website for the e-services".*

Culture

The Quality, Risk and Communication Manager indicated that the national culture is one of the factors that affect the widespread use of e-government in Egypt. Citizens prefer the traditional face-to-face way to get government services. This point was evidenced in the questionnaire results (80% of the respondents preferred the Face-to-Face method in conducting any transaction with the government), and it was evidenced also in the model of e-government challenges in 'resistance to change'. If the government succeeds in changing the culture for example provide some services for free for the first time usage to encourage citizens, definitely this means more e-government adoption. In this regard, the official stated:

> *"In my opinion, Egyptians according to their existing culture prefer to get face to face service from the government counters. But, we want to change this culture by building awareness among them regarding the benefits of using online services. I strongly believe that changing citizen's culture is crucial for the widespread of e-government".*

Citizens Awareness

The Quality, Risk and Communication Manager stressed on the significance of citizens' awareness of the available e-government services, the benefits of using them, and the government efforts to make its e-government services trustworthy. This will boost their trust in these services and therefore increase their willingness to use them. The Quality, Risk and Communication Manager highlighted this issue:

> *"It requires from us to create awareness among citizens and clarify the usefulness of these services. Also, we will increase citizen's trust in e-government services by explaining to them that delivering online services will make things easier for them and they will be 100% secure. This, there is no reasons for concern".*

Perceived Benefits and usefulness

The Quality, Risk and Communication Manager agreed on the importance of concentrating on creating awareness among citizens on how the use of e-government information and services could save their time and money. This result is similar to the

questionnaire results which shows that perceived value is significant to the adoption model (**section 5.81,** and **5.5.2**), which means more valuable benefits will lead to more e-government adoption. The Quality, Risk and Communication Manager, highlighted this issue:

> *"We have a plan to promote and advertise our e-government through posters and other channels. We will educate citizens about the objectives of e-government services, the online services that we already have, and its benefit and so on".*

However, citizens will not perceive the full benefits of using e-government services until the public organisations provide them with sophisticated and advanced electronic service capabilities such as e-democracy. The Quality, Risk and Communication Manager, also highlighted this issue:

> *"However, we will begin the large-scale promotional campaign after launching more mature e-government services. We believe that citizens will perceive the benefits and the value of using e-government services once they can get complete and integrated electronic services".*

Ease of Use

Public organisations should provide a straightforward and easy to use service delivery mechanism with minimum effort required. Again this resulted from testing the model, which provided evidence that perceived ease of use is a significant predictor to attitude towards using e-government services. In this regard, the Director of E-operations at NITC said "providing easy to use services to the public is also important"

Digital Divide

The digital divide is one of the main challenges for e-government adoption and implementation especially in developing countries. This challenge is particularly apparent in Egypt. According to the MCIT e-government strategic plan, the e-government vision in Egypt is to provide e-government services to citizens across society, irrespective of their education, geographical location, economic status, or ICT

ability. However, interviewees pointed out many obstructions to access the Internet in general, and the e-government service in particular especially to those who live in rural regions in Egypt. These include: ICT Literacy, education, culture, relatively high cost of personal computers and internet access, and age. In this regard, the Quality, Risk and Communication Manager stated:

> *"We have different segments of people in the Egyptian society. We have educated people, old people, and people who live in rural regions. I strongly believe that changing citizen's culture is crucial for the widespread of e-government. In addition, it's important to pay attention to citizens of rural regions to help them in using e-government services. As you know, those people are not as wealthy as the people in the capital and other major cities. Therefore, they are less technology oriented".*

Service Quality

Some interviewees mentioned attributes related to service quality as important factors for e-government adoption. Among these attributes were: providing reliable e-government services, response to citizen's enquiries quickly and accurately, and auditing of e-government portals and websites to ensure that all provided information is accurate and up to date. In this regard, the Head of Change Management pointed out the important role of reliability and response:

> *"If an e-service is always down, citizens will not use it, after providing an e-service, there must be customer service to answer citizens' questions and enquiries clearly and quickly".*

6.3. Citizens Interviews

6.3.1. Introduction

For citizens' interview analysis, data was first transcribed with several attempts that were needed and took place to extract the information relevant to the study. Interview data was written with quotations or specific evidence (Creswell, 2002) and analysed manually. After doing so, attempts were made to find connections between the data gathered qualitatively. The author selected content analysis as a method for analysing the data gathered. The qualitative analysis of the data gathered from citizens interviews led to understand the factors affecting the adoption of e-government services and the barriers facing the implementation of e-government services in Egypt.

The interview questions were divided in to two parts. The first part was investigating citizen point of view about the factors that influence their decision to accept or reject the use of services offered by the government online. The second part was trying to find out their opinions about the barriers facing the implementation of e-government services.

6.3.2. Analysis Results

Demographic Analysis

Sixteen Egyptian citizens were interviewed and the table below identifies the various users according to characteristics that capture the potential key variables of:

a) Gender;

b) Age (using age bands of below 30, 30-39, 40-50 and over 50);

c) Education (college degree, post graduate) and those are the same variables included in the questionnaire.

Table 6.2 Demographic Profile of Respondents

No	Gender	Age	Education
1	Female	25	College degree
2	Female	29	Post graduate
3	Female	32	Post graduate
4	Female	37	College degree
5	Female	40	College degree
6	Female	49	Post graduate
7	Female	53	College degree
8	Female	60	Post graduate
9	Male	24	College degree
10	Male	28	Post graduate
11	Male	34	Post graduate
12	Male	39	College degree
13	Male	43	College degree
14	Male	47	Post graduate
15	Male	55	Post graduate
16	Male	63	College degree

Demographic Distributions:

The participants were divided equally between the gender variables. The following figures (**Figure 6.5, 6.6**) show the distribution for the males and female participant amongst the age and educational level variables

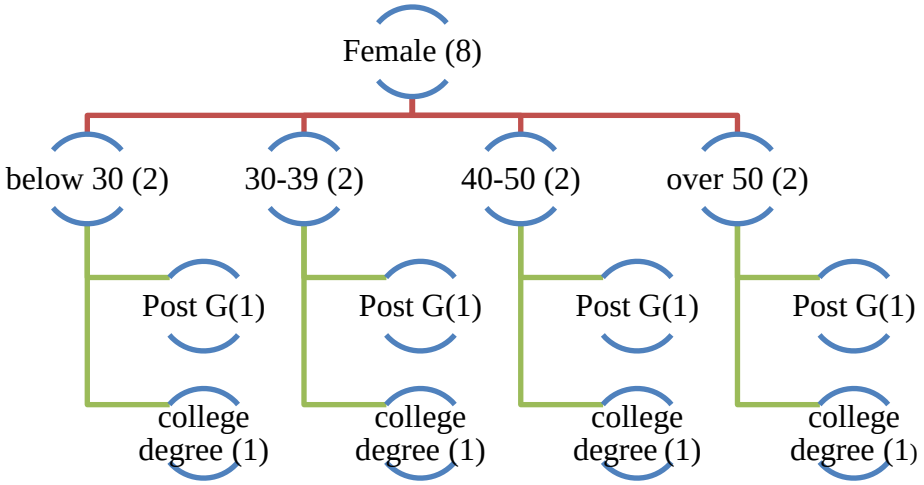


Figure 6.5: Female distribution

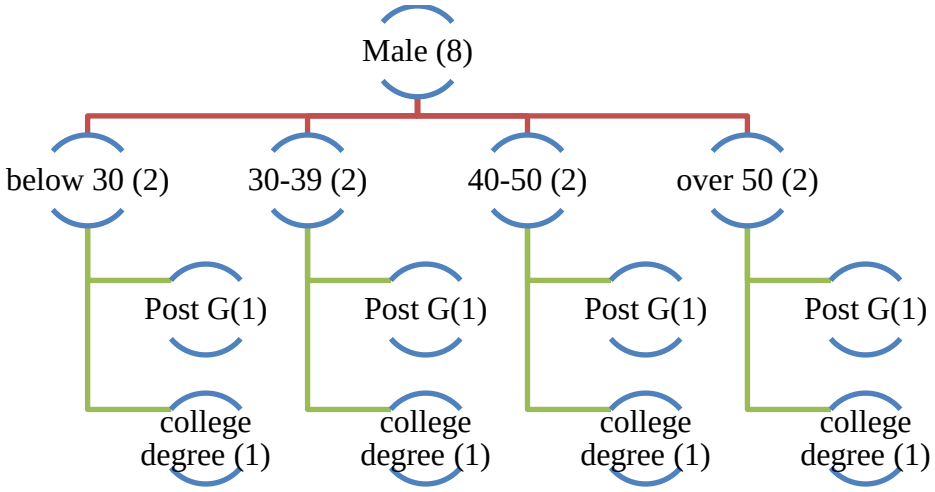


Figure 6.6: Male distribution

The majority of the respondents support the basic idea of e-government, even if they currently make no use of it. Overall, only 2 respondents out of 16 (No: 4, 12) could be said to be negative about e-government, although both actually make use of it. More fundamentally, much of support for e-government services in Egypt can be seen as essentially negative (because they are not looking for the benefits of e-government that are not available in face to face interaction but rather to avoid cons of face to face) and as a way to avoid the problems in dealing with workers' bureaucracy. Two examples of these comments are:

"Another indirect reason is the arrogance of officers who don't behave in a respectful manner and always complicate things"

"So if there is a way to obtain the services without facing those people, it will be a real benefit"

Some respondents looked to e-government services to remove the level of discretion that they felt was exercised by government employees:

"It will limit it [i.e. corruption], but it may still persist, only in case they process everything automatically, and employees just enter data. At that stage, I will be relieved; all transactions will be treated equally"

These two themes of avoidance of engagement with officials and reduction in corruption were summed up by one respondent (No: 14) who currently made no use of e-government services, as:

"I don't think that convincing people of my generation will be a hard task, also there should be institutes and places where people can get courses how to use it. But I don't think it will be difficult to make them adopt it, as E-government services can be very efficient in fighting bureaucracy and corruption".

It was clear there was underlying tendency to accept e-government services, even if all it achieved was less face-to-face contact with the Egyptian bureaucracy. On the other hand, some responses support earlier research (Norris and Moon, 2005) that the loss of physical interaction may make it easier for state officials to ignore issues raised by citizens, as it is very easy not to reply to an email or other form of electronic message.

The respondents are divided between those who are supportive and those with a negative view of e-government. This result was based on the basis of their answers to questions about their actual usage. Notably, a number of respondents initially said they made no use of e-government services but when pressed cited a particular instance (such as applying for birth certificate) they said yes we use it once or twice. The reasons for saying no at first were:

• Not realising that the term e-government services reflect what they have done.

• They forgot about it because it was once or twice usage.

This section explores the factors affecting the consumer adoption of e-government services in Egypt. Those factors were mentioned by the interviewees. The following takes each of these suggested factors and investigates if there is any relation between them and the adoption of e-government

Adoption Factors

Age

The interviewees were asked directly if age had any influence on their decision to use e-government services. To assist analysis, interviewees were categorised into four age bands: under 30, from 30 to 40, from 40-50 and over 50, each category had 4 interviewees. The following table shows the relationship between the age categories and the usage of e-government services.

Age	Usage of E-government		
	Yes	**No**	**Total**
Under 30	**4**	**-**	**4**
30-39	**4**	**-**	**4**
40-50	**2**	**2**	**4**
Over 50	**-**	**4**	**4**
Total	**10**	**6**	**16**

The Six respondents who reported making no use of e-government services were over 40, with no respondents over 50 having used it. The transcripts of the interviewees were reviewed to explore if they believed that age was a factor that influence their usage of e-government services. From the youngest group, one of the interviewees was stressing that the internet and e-government had universal benefits:

"I don't think that factors like age or gender are important, as the internet has become essential for everybody".

In contrast, some of those aged over 40 did see age an issue:

"When reaching a certain age, it becomes harder to learn new things; one tends to stick to what you already know".

Despite this, they were clear in their opinion about e-government services:

"I think it's a good thing".

Another respondent from age over 50, made very little use of the internet, and didn't use the e-government service before; stated that age can be a constraint for not using these services:

"Age can be a big influence, for example, when I was young I had more patience and could spend three hours reading a book, but now I don't have the same patience as before, I don't have the same eyesight or concentration, so this has some impact"

On this basis, age can be regarded as a factor influencing the adoption of e-government services. The interviewees have raised age as having an influence and reflected less about their willingness to use e-government services and more their concern about how to learn to do so. This result is compatible with the result of the survey questionnaire, which showed that there is significant negative correlation between age and e-government adoption which could indicate that the older the citizens are, the less the adoption rate might be.

Gender

Gender can be mapped onto usage of e-government as follows:

Gender	Usage of E-government		
	Yes	**No**	**Total**
Male	**7**	**1**	**8**
Female	**3**	**5**	**8**
Total	**10**	**6**	**16**

This table shows that male respondents make use of e-government services more than females. However, when the transcripts were reviewed, there was no evidence that gender was the driving force. The interviewees were asked directly if gender had any influence on their decision to use e-government services, none gave a positive response and all were clear that gender played no role. However there were remarks from the females who used e-government who stated:

> *"Dealing with a screen is better, women will feel more comfortable, with privacy and less harassment", "because you may meet people of all kinds some rude, some who frustrate you, some who want a relationship with you... dealing with a system is better".*

Results here can be considered consistent with the survey questionnaire result, which showed that there is low significant correlation between gender and e-government adoption.

Education Level

Education level	Usage of E-government		
	Yes	**No**	**Total**
College degree	**4**	**4**	**8**
Post graduates	**6**	**2**	**8**
Total	**10**	**6**	**16**

This table shows that post graduate respondents make use of e-government services more than college degree. However, when the transcripts were reviewed, there was evidence that Education level was the driving force. The interviewees were asked directly if Education level had any influence on their decision to use e-government services, twelve respondents out of 16 reported that Education level had direct influence on their decision to use e-government services for example one respondent stated:

> *"When the person is more educated, he can see and understand the benefits from using these services offered by the government online, and use them".*

Educational level also can affect social independence, since post graduates are more likely to be independent than under graduates, hence needing to do their own e-government services as opposed to undergraduates who may still rely on their parents . This is an issue that can be observed here in Egypt in particular where social independence is directly connected to level of education (not like developed countries where young adults work at a young age and live alone)

This result is compatible with the survey questionnaire result, which shows that more educational level the more usage of e-government.

Trust in E-government

Trust was mentioned by all the respondents in relation to their decision to adopt e-government. As risk was often framed in financial terms, some respondents saw e-government as more trustworthy as it involves little financial risk. Others were very fatalistic, believing that there is little they can do to prevent theft of individual or financial information. One reason for this fatalism may be explained by a perception that any transactions with the Egyptian government are routinely monitored, as the following quotation indicates:

> *"The government websites are closely watched; every email you send them is kept and recorded".*

Although this was a common view, it is not shared by all. For example, one interviewee made the following comment: "We usually trust our government". On the other hand, one respondent assumes there is no effective privacy when dealing with websites in Egypt and accordingly disregards this as a criterion for using the e-government service. Other respondents offered similar explanations:

> a*) "I may think about two things: the first is if on-line I will get the same service I get when I go to do it myself. The second thing is the privacy of the information I will provide to the website. But I think the same problem exists even if I use the paper-based method"*

> b*) "I can't overcome it. Only if I face problems with the service and in this case I will overcome it by doing the work manually"*

The distinction between the perceived risks of e-government adoption and ecommerce usage was effectively summarised by this interviewee as:

> *"I know I am not going to lose anything for trying because it is a government agency, whereas I could lose money in e-commerce. I can go to a government office if something went wrong, but I cannot guarantee my rights with commercial sites… because this is a government agency and I can reach it at any time."*

Another interviewee went further and suggested that trust should be automatic:

> *"It is a government website and I think security is required, and the user who will make a transaction should trust it, because it's a government".*

Others saw the loss of personal data as of greater importance:

> *"The most important thing was the information provided … Maybe, it could be someone who hacked the website and stole the information, I won't blame the website for this, but the lack of technical support means there is not enough protection. Stealing my personal data is stealing my privacy: my accounts, transactions, personal details….this can bring me other problems."*

Others stated clearly that Trust is an important factor to accept or reject using e-government services, for example:

> "*a) "I think it's all about trust. The first time I used the internet, I just wanted to know what it is about. In the beginning, it was only like a game, and then we began to understand how to use it, what are its advantages and disadvantages, how some websites are trustworthy while other are not….But till now, when it comes to buying service from the government online we still lack trust here".*
>
> *b) "Trust is the most important factor I believe, and then comes risk taking"*
>
> *c) "The most important question that I asked myself was "how to trust government website?" is there any risk when using credit card, I also needed to be sure that the service will work when I'll receive it"*
>
> *d) "Is checking that the government website itself is 100% secure, for example it must be a reputed website not any website, because there are websites that can be run by hackers to steal your information"*

To conclude, the majority of the respondents stated that's Trust is a major determinant to accept or reject using e-government services and its similar to the result obtained from the survey which provided evidence that trust is one of the factors that affect the actual use of e-government services in Egypt. .

Perceived Usefulness and Ease of use

This section starts by exploring the various ways the respondents described either usefulness or ease of use as criteria in their decision to adopt e-government services. Some respondents, for example, clearly set out usefulness as their key criterion and others were equally clear they relied on ease of use. For these respondents, the importance of usefulness and ease of use is an inverse relationship (i.e. if one is important, the other is much less so).

Of the sample, majority of respondents indicated that both ease of use and usefulness were important in their decision.

For this interviewee who sees usefulness as a critical variable, the reason to use e-government services was expressed in the following terms:

> *"I use it because it helps me get my work done. I can tell you exactly how participation is economically sound for me and for the country. Why use the car to go … burn fuel, harm the environment, and pay for parking when I get there, and go through this again on the way back? I can stay home and finish all of this without leaving the house."*

The difference between this response and those of interviewees who see it as important is relatively minor but has some interesting nuances. It was an indication that they made different decisions for different aspects of e-government services, but the decision was essentially driven by a view that the service had to be useful, but with some attention to ease of use. Typical of this group was 1:

> *"Yes, I use the university website, it is essential for me to see my marks, communicate with the teachers ….etc. but in the other general transactions, like renewing my passport; I did it the usual way"*

On the other hand, others only made use of e-government services when they had no choice, for example:

> *"Yes, I was obliged to use it because of my job …. Yes, obliged, if it didn't have to deal with the Ministry of Commerce, or the Customs office, I wouldn't do it".*

Finally, those who described usefulness as being of limited relevance often reflected on problems with some aspects of e-government in Egypt. One of the respondents stated:

> *"Here in Egypt, I have tried it many times, but I couldn't renew my residence permit. I visited the website, and went to the relevant section, but they just ask you to fill in your ID number, name, age and phone, and they will contact you later"*

However, there is still a trade-off between usefulness and ease of use. To some, usefulness is dominant and ease of use has either no or limited relevance. To others,

ease of use is dominant and this overrides any opinion as to the underlying usefulness of the service on offer, and to the majority both are important.

This result is similar to the questionnaire, as the majority of the respondents indicate the importance of both perceived usefulness and perceived ease of use, in the questionnaire both were found significant variables to adopt e-government service

Website design

Some of the respondents saw the design of website as the key factor for the use of online services. They stressed on a number of issues, as indicated by the following quotations:

- *"Make websites easier, more secure, improve internet networks so that people can access websites easily … I sent an application, and until now I didn't get any response, until now the employee didn't open my application".*

- *"information or services are supposed to be accessible, this is the task of the ministry", in this context they were not, making the system too hard to use to be useful;*

- *"Yes it is, websites that are easy to understand look more appealing and more acceptable to people than other government websites that are difficult to use or not user friendly. However, there is another factor to mention here which is the connection speed or the speed of the website. … if a government website is so heavy and takes too long to load then I will not accept it and I would not want to use it at all. It is all about doing things faster and easier so if one of them is missing then we are not interested".*

- *"I want the website to be fast, want it to fill all my personal information when I enter my national ID number, rather than fill them in myself"*

As summary this result is compatible with the questionnaire results as both showed the importance of the design of the website (accessibility, speed, data accuracy.. etc) as factor to use e-government services

Culture

Some of the respondents stated that culture may influence their decision to use or reject e-government services. According to their answers, culture can be divided into first whether using e-government services fit with the individual's own set of values (for example: religion values); and second whether their family group exerted any influence to use the service.

Two of the respondents (No: 3,11) indicated that their own cultural beliefs had influence on their decisions, both of them linked their decision to the idea of being modern and fitting in with a high-technology world. One of them stated (3):

> *"As the world is moving towards globalization, this will become standard in the coming years, so it is essential to keep pace with it". 11 offers a slightly different, but not contradictory, explanation: "because my dream is to see our Islamic country fully developed".*

Other respondents indicated that their decision to accept or reject the use of e-government was influenced by family group. One of them (5) described how members of their family had warned them not to engage in e-government services due to the risks, she stated:

> *"80% advised me not to use any services offered by the government online -as you know in our society- our fathers and elderly people… my family for instance would never use internet for such activities many of them won't. They fear the lack of credibility and security. There is nothing there that gives them adequate guarantees".*

This factor was will be examined in the research model in the future work to see their effect on e-government adoption.

Public Values

According to the interviewees, they stated that managing time and providing better value for money was one of the major reasons for using online services offered by government instead of using the traditional way (Face to face). One of them stated:

> *"You can spend 3 days in the traffic management in order to renew your vehicle licence; you need to fill a lot of papers, get a lot of signatures, visit a lot of offices. I can't tell you the horrible procedures to pay the fines adding to all this you need to pay a bribe to the government employee in order to finish these procedures fast. But doing it online will save time and money; just enter my vehicle number the fines will be calculated, pay it online, receive the new licence in 72 hours to your home without any effort".*

This result is compatible with the questionnaire, as perceived public value was proven to be a significant factor to use e-government services.

Implementation Barriers Factors

According to the findings, there are many organisational, technical, social and financial barriers that are facing e-government services adoption and diffusion in Egypt. These challenges and barriers are explained in the following section and based on the interviews' analysis results.

ICT Infrastructure

The ICT infrastructure including networks and servers is an essential part of e-government implementation and diffusion (Ndou, 2004). It enables government agencies to cooperate, interact and share work, facilitating the daily tasks and using the technology to save employees' time and effort. Infrastructure aspects remain the main challenge as it is viewed by previous research (Bourn, 2014) as a significant barrier to the provision of government services and transactions online. It also indicates that some organisations within the public sector are still lacking in terms of their IT infrastructure while others need to invest in the installation of new equipment and need to upgrade

their existing infrastructure before considering adopting modern e-government services. This indicates that development of ICT infrastructure within government organisations should be a high priority in order to implement e-government.

An indication of lack of networked ICT infrastructure is captured by this participant:

> *"Their ICT infrastructure was built many years ago and does not provide any services today; it is really needed to be updated before speaking about e-government or eservices".*

Interviews findings highlighted the perceived importance of creating a standardised, modern ICT infrastructure and upgrading the existing systems to enable government agencies, organisations, citizens and private sectors to participate in e-government initiatives and accept this new phenomenon. Practically, Layne and Lee (2001) emphasise the importance of information and communication infrastructure as a foundation for integrating information systems across government organisations. It must be in place before e-government services can be offered reliably and effectively to the public (McClure, 2001). Indications are that ICT infrastructure, particularly in e-government adoption and diffusion processing, is a most important challenge and one that must be carefully handled at both governmental and private levels. The importance of this factor was noted by several interview respondents. The successful adoption of e-government systems will require a widespread, common and modern ICT infrastructure.

Privacy, security and trust in e-Services

Security and privacy of information is another serious technical challenge identified by the interviewees and is a well-documented issue for e-government implementation all around the world (Layton, 2007). Participants felt that using websites to transfer their personal information (such as name, picture, and date of birth, ID number, and credit card details), sharing information with public agencies online or electronically is not safe. They are afraid that e-services websites are not secure enough to protect their

private information from being misused or distorted by hackers. They feared that confidential information can be exposed once transferred electronically, or viruses might destroy data. One participant said:

> "*I do not trust these eservices. How can I get my needs when I sit in my home, I have to go to the right person and get what I want hand by hand"*.

Another participant commented:

> *"My friend used his visa card to buy a laptop from the Internet but because the lack of security he lost his money and did not receive any goods so, how can I trust the Internet"*.

The participants' comments also included some security issues such as viruses, hackers, and spam that would be a major challenge for e-government adoption and diffusion at a society level. Unfortunately, this fear from a perceived lack of security has created disinclination or unwillingness within Egyptian citizens to accept and use of e-government services (Al-Solbi and Al-Harbi, 2008). In fact, security, privacy and confidentiality are significant and essential issues for all citizens and governments worldwide (Sharma and Gupta, 2003). Citizens want to ensure that their information and all other data are safe when they are using e-services. The government is already providing secure access points but still citizens do not trust the government.

In summary, security and trust in e-service systems seem to be a significant challenge for the Egyptian government to deal with. It is indicated that an effort to address the combined technical and cultural impediments to adopting e-government may yield positive results. Practically, an increase in public awareness and education initiatives through seminars, TV campaigns, brochures, etc., may be central to public acceptance and adoption and to generate trust in the secure use of networked systems. This result is compatible with the questionnaire concerning the issue of trust of internet and government.

Lack of qualified personnel and training

The e-government system can be implemented successfully if qualified personnel are available to take the role of starting and developing the e-government system. Lack of IT professionals and required computer training courses is a major issue acknowledged by the participants. The majority of participants mentioned that there is a lack of IT professionals to lead the implementation of e-government. One reason for that lack, as mentioned by one participant, is the moving of IT expertise from the public sector to the private sector because government salaries are relatively low by comparison. Moreover, another participant complained about the lack of IT staff at all levels such as computer technicians, programmers, engineers, web designers and professional managers. As such, the training of existing staff members is a very important factor to accelerate the adoption and diffusion of any new technology. Many participants agreed with the importance of investing in training of existing staff members because they have strong workplace knowledge that will help them integrate the use of e-government services and applications

Lack of policy and regulation for e-usage

The e-government systems are new technological revolutions for many countries around the world and to use this technology in an effective manner it needs supporting policy and a regulations framework. To be effective, laws and regulations should cover all applications and related functionalities such as e-payments, e-mail usage, copyright rules, e-crimes, e-business, e-commerce and others. The existence and effectiveness of these laws will give all users more confidence and assurance to use e-applications and recommend others to use them. Already the Egyptian government has issued many government policies and regulations including e-transaction law, information criminal law, shift to electronic methods decision and many others (AbdelRahman, 2010). Although far from comprehensive, these laws and regulations are playing an important

function in promoting effective communication between citizens, business and government to accelerate the adoption of e-government services on all levels. The interviewees suggested that lack of appropriate laws for usage is considered one of the low level obstacles of e-government adoption and diffusion.

Lack of programs to promote e-government benefits and advantages

Promotion is one of the most significant factors of successful e-government systems. For any new technology there are many steps to convince and encourage people to use it (Geetika, P., 2007) and adopt it so, government sponsored promotion and advertising will be a significant aid to accomplish this task. One participant commented:

> *"I did not hear about any workshops or seminars about e-government in the society, I just read about it in the Internet websites" while a second said: "I heard only about the reward competition (which was carried by the government to promote renewing the driving licence online in local news letters and I did not know what that competition is".*

The interview results indicate that the lack of programs to promote the e-government services benefits and advantages is considered one of the important barriers to the adoption of e-government in Egypt society. From this it suggests that all governmental agencies might benefit from the execution of a campaign to raise and promote awareness of e-government and other new e-services, along with their benefits and advantages. As has effectively been executed by e-commerce, a program of cross channel marketing and advertisements could promote popular and high profile online applications from any e-government portal through a range of public advertising media. This will increase general awareness, acceptance and usage of e-government services among the public. Cross-media advertisements might include newspapers, brochures, TV, messages on public transport and subway, banners in public places, road shows and seminars would also increase e-government user population. Finally, there is an

indication that initiatives could be taken by the Ministry of Information and Communication Technology (MICT) to promote and advertise e-government services in the society to promote better understanding and usage of e-government services in Egypt.

6.4. Discussion

The aim of conducting interviews was to understand the situation of e-government in Egypt, in terms of challenges that face the implementation and adoption of e-government from the managerial point of view; and also to find common relationships on technology acceptance factors between the survey results and interviews' results. To answer this research question

How can the findings of this research assist Egypt and other Arab countries in similar circumstances in planning and up-taking e-government implementation and adoption?

Two models were created as a result of conducting the interviews with the key government officials who are currently in control of the e-government program in Egypt: Director of E-Operations, Quality, Risk and Communication Manager, Head of E-services and strategic planning, Head of Change Management, and the E-government Projects Coordinator. The first model represents the challenges that face the Egyptian government in implementing the electronic government services in Egypt. Those challenges concentrate on e-government stakeholders, who are citizens and government. This research endeavoured to suggest solutions to the Egyptian government on how to overcome these challenges. The Arab countries that share the same circumstances as Egypt in implementing the e-government can benefit from these points as follows. If the country is in the first stage of implementing e-government, they can tackle these challenges before they actually happen to avoid their occurrence later on, as in the case of Egypt. Alternatively, if the country had already implemented the e-government, and

is currently facing similar challenges, it can adapt any of the solutions presented in this research to overcome their challenges.

The second model represents the government opinions about the factors that affect the adoption of e-government by the Egyptian citizens from their point of view. Some of these factors were already addressed in the questionnaire, which provides evidence for common factors between the questionnaire and both types of interviews (with government officials and citizens) hence triangulating those results.

Comparing Quantitative and Qualitative results

Comparison between qualitative and quantitative results showed that findings confirmed some of the established research hypotheses. In this study, comparing the quantitative results obtained with the research hypotheses showed that findings confirmed all research hypotheses except the effect of perceived usefulness on Behavioural Intention towards using e-government, and the demographics hypotheses. **Figure 6.5** below shows the integration between all results. From this figure we can see for the adoption factors, that **Attitude** was only mentioned in the survey finding, which means the government officials, need to be aware of the importance of attitude in influencing the Egyptian people in adopting the e-government which was proved to be a significant factor in the research model and try to find ideas of how to influence person attitude to increase the adoption rate. While government interviews introduced new factors: citizen awareness, digital divide, culture, service quality which should be test as external variables to the TAM model in the future. Also it shows the integration between citizen's point of view and government point of view concerning the barriers of implementing e-government service. Citizen added new factor from their point of view that government should add it to their list of barriers: Lack of qualified personnel and training.

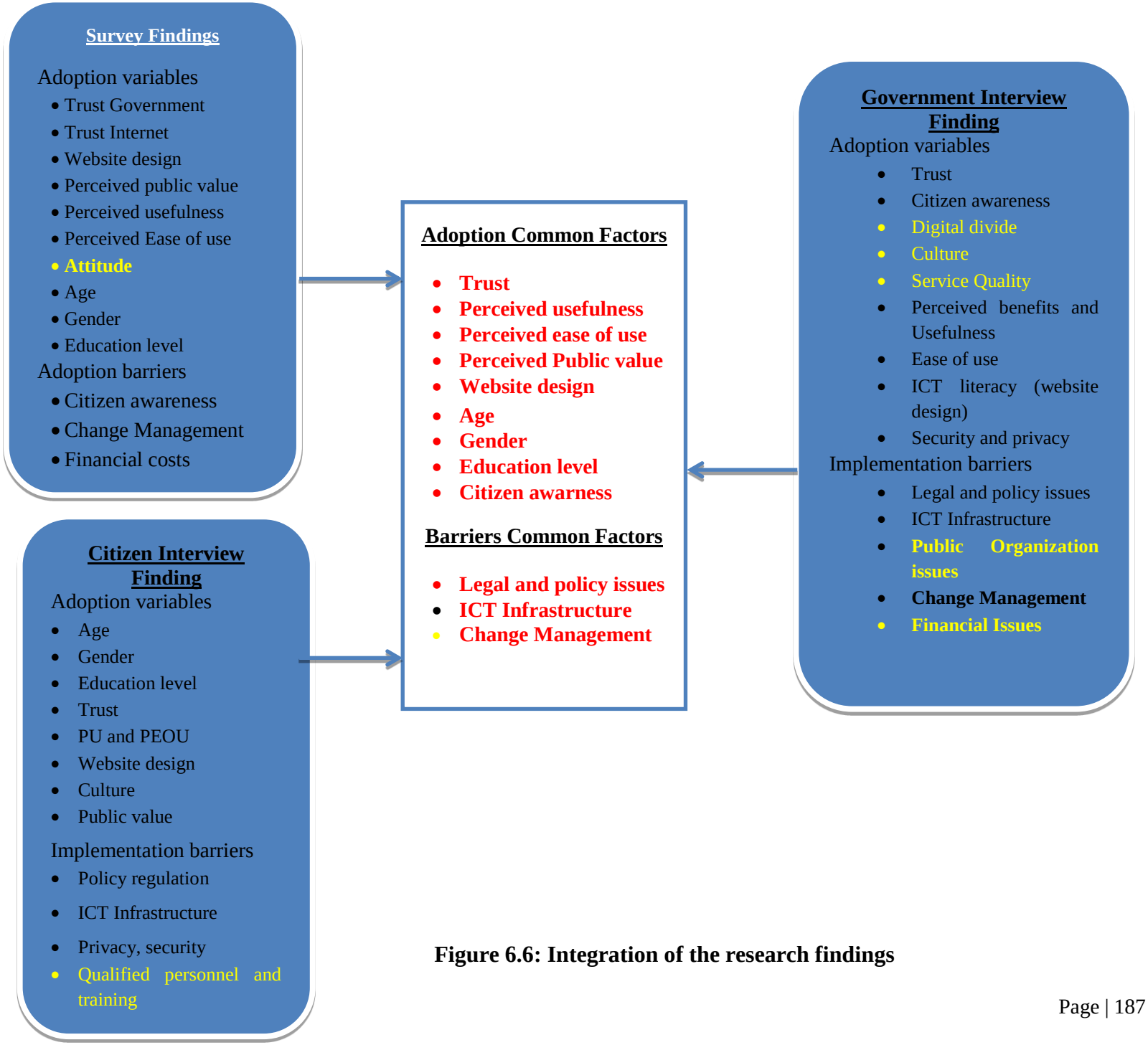


Figure 6.6: Integration of the research findings

6.5. Summary

This chapter examined the factors influencing challenges in the implementation and adoption of e-government from managerial perspectives. The chapter discussed and analysed the results of the interviews conducted with e-government officials in Egypt. Each interviewee expressed his ideas towards the main challenges facing e-government in Egypt and suggestions to overcome them. Barriers and factors affecting the citizen's adoption of e-government services were also explained by the interviewed e-government officials. Two models were created as a result of analysing those interviews, one for the e-government challenges, and the other for challenges of citizen adoption for e-government. The results from the interviews supported the findings from the questionnaire, and highlighted new variables, which if tackled in the future will increase the adoption rate. A comparison of the results from both qualitative and quantitative was presented to illustrate a holistic view of the e-government in Egypt from both stakeholders' perspectives (citizens and government) The next chapter is a summary of the whole thesis addressing conclusions, contributions to knowledge and future work.

7. Conclusion

7.1. Introduction

This chapter summarises the work described in this thesis, highlighting the research gap and showing how the research contributes to filling this gap addressed by the research question. In addition, this chapter will provide a discussion of the contributions the thesis has made in the area of e-government adoption. This will then be followed by a brief discussion of the practical implications of the research findings, an outline of possible research limitations, and a review of future research directions in the area of e-government implementation and adoption. The following diagram shows chapter outline:

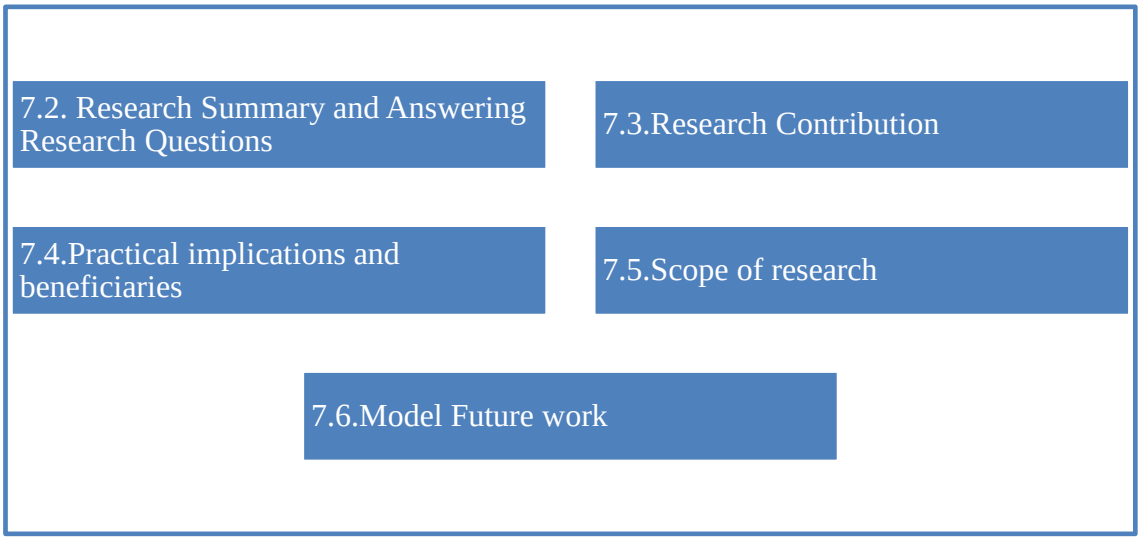


Figure 7.1: Chapter Outline

7.2. Research Summary and Answering Research Questions

The acceptance and success of e-government is dependent upon citizens' willingness to adopt this innovation in public service delivery. Therefore, as indicated in Chapter one, the main Aim of this study is to gain a better understanding of the factors that impact the citizens' adoption of e-government services in Egypt. Identifying such factors would improve the likelihood of increasing the adoption rate of these services by deepening the knowledge about the factors which facilitate, or hinder, the adoption process.

The research problem was the low adoption of e-government in Egypt, which has been identified in Chapter 1 and showed various motivations for conducting this research. It also stated the one of the contribution of knowledge, which was to develop a new model of e-government adoption in order to identify the factors that affect e-government in Egypt. This model can inform decision-makers and implementers of e-government.

The literature findings in Chapter 2 discussed the issues related to e-government in general with a view of identifying the scope of the research problem. It started by presenting a brief history of the emergence of e-government, and then went on to focus on the taxonomy of e-government definitions. E-government interaction dimensions were identified as G2C, G2B, G2G, and G2E. These dimensions explained initiative and the interaction-patterns of each sector. Chapter 1 further discussed the difference between developed and developing countries in e-government adoption in terms of culture, citizens, and infrastructure, then presented an overview about e-government in Egypt to understand more closely the current e-government situation in Egypt. The different models of adoption of e-government were discussed, with their relationship, justifying the use of Technology Acceptance model.

The researcher identified the following gap in the literature in relation to the use of technology acceptance models in e-government in Arab developing countries from the

users' side on one hand, and the importance of additional factors affecting acceptance on the other hand. Specifically, there is no research that has modelled users' adoption of e-government (using TAM) while taking into consideration trust in government, trust in internet, website design, the public value, and demographic factors (age, gender and educational level) - neither in Egypt nor in other countries in general. This gap has been filled by this thesis, which has employed a widely used and well-known technology acceptance model for IT (TAM) to be able to model and understand factors influencing e-government adoption in Egypt. In doing so, a new model was proposed in Chapter 3, which contained a set of technological, political and social issues (Trust in Government, Trust in Internet, Website Design, Perceived Public Value, Age, Gender, Education level) facing e-government system adoption. It is proposed that this model provides a good understanding of the factors that affect the adoption of e-government initiative. Moreover, it is proposed that this model will provide better support to decision-makers for facilitating e-government implementation and adoption. Therefore, the research model was tested, validated, and revised in Chapters 5 and 6.

The research method (chapter 4) was developed by first discussing and justifying a selection of qualitative and quantitative research approaches to collecting data in an e-government context. The data was collected by conducting a survey among citizens (e-government user's adopters and non-adopters) and interviews with government employees involved in e-government implementation activities and Egyptian citizens in order to test and validate the proposed model presented in Chapter 3.

Research questions and objectives

The following diagram shows the connections between the research questions, objectives and contribution to knowledge,

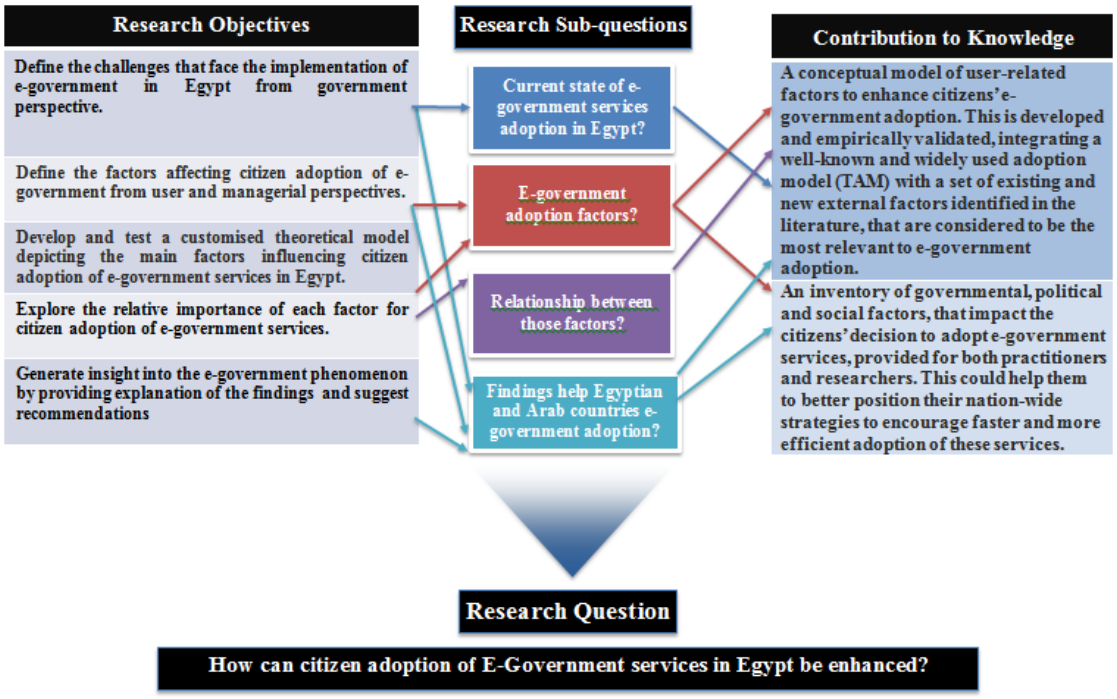


Figure 7.2: Integration between research questions, objectives and contribution to knowledge

To achieve the aim and objectives of this thesis, research question with 4 sub questions were defined in Chapter 1 as shown in **Figure 7.2**.

The main research question

How can citizen adoption of E-Government services in Egypt be enhanced?

<u>Sub Questions 1 , 2 and 3</u>

1. ***What is the current state of e-government services adoption in Egypt?***
2. ***What are the factors that influence the citizens' acceptance and adoption of e-government services in Egypt?***
3. ***What is the relative importance of these factors and the relationship between them?***

Based on the literature review, e-government current state and e-government adoption factors were identified and analysed by the researcher (Chapters 2 and 3). Chapter 5 and 6 then analysed and presented the empirical data collected from Egyptian citizens to record their perceptions of adoption, supported by the results from the interviews with government employees from the organisations responsible for e-government implementation in Egypt and with the Egyptian citizens.

The research questions (2 and 3) were answered supporting predictions of the TAM that Perceived Usefulness, Perceived Ease of Use, and Attitude positively influence the Behavioural intention regarding the use of e-government. Seven external factors were included in the model: Trust in government, Trust in Internet, Website design, Perceived public value, age, gender and education level which four of them (Trust in government, Trust in Internet, Website design, Perceived public) were evidenced to be positively influential on e-government adoption.

The results of this study revealed that the research model explained 93% of the variance (**chapter 5 table 5.7**) in citizens' intention to use e-government services according to the goodness of fit index. In addition, as expected, attitude was a significant predictor of usage intentions. The findings showed that citizens' behavioural intention to use e-government services was mostly influenced by their attitude only not by attitude and perceived usefulness. This finding is different from TAM prediction, which states that behavioural intention is influenced directly by Attitude, and Perceived Usefulness as shown in **section (5.8.4)**.

The results also showed the Perceived Usefulness, together with Perceived Ease of Use, had a positive influence on the citizen Attitude to use e-government services, and Perceived Usefulness has more impact on Attitude than Perceived Ease of Use. Also the findings revealed that Trust in Internet, Trust in Government, Website design, and

Perceived Public Value were significant predictors of the citizens' beliefs (Perceived Usefulness and Perceived Ease of Use). Perceived Ease of Use had more impact on Perceived usefulness than other external factors did, followed by Perceived public value. For Perceived Ease of Use, Trust in the Internet had the most impact on it.

Question 4:

How can the findings of this research assist Egypt and other Arab countries governments in similar circumstances in planning and implementing e-government adoption?

Adding to the research model, two models were created as a result of qualitative interviews analysis to show the challenges that face Egyptian government in implementing the e-government from managerial and citizen's perspective. Both models can help governments by providing them with a list of the challenges and adoption factors with solutions or recommendations on how to overcome those challenges and increase the adoption rate of e-government services. Arab countries that share similar culture and circumstances can adopt any of these solutions in their e-government solutions.

7.3. Research Contribution

Although research exists that explores citizen adoption of e-government services in many countries, the author argues that currently there are no independent studies that examine e-government adoption in the Egypt. The full potential of electronic government services is unlikely to be realised without substantial citizen adoption of such services and their participation in such initiatives. In this context, the outcome of this research has extended the boundaries of knowledge in the area of e-government by making a valuable and innovative contribution as explained below to explain factors affecting adoption of its services and recommend methods for its enhancement. This

research added to some parts of literature, for example: e-government adoption (**section 2.6**), Technology Acceptance Model (**section 2.7.4**), Determinants of e-government (**section 2.8**) and E-government adoption and TAM **(section 2.9**).

From a practical angle, the thesis has contributed to better understanding e-government efforts particularly in an Egypt context through the empirical work undertaken in Chapters 5 and 6. Finally, the overall aim of the research is revisited at the end on each of the previous chapters where the links between e-government adoption factors are further explored through a synthesis and analysis of empirical results against the literature. By these research efforts this study has provided a novel contribution to the area of e-government implementation and adoption. These contributions are:

1. Creation of a new adoption model, which is the extension of TAM model, to include social, political, and design influences; specifically, government and Internet trust, perceived public value, and website design dimensions and to identify the relationship between them. The contribution of this model was that it demonstrated that Behavioural intention to use e-government system was significantly affected by attitude, which in turns significantly influenced by users believes (perceived usefulness, and perceived ease of use). The external variables (government and Internet trust, perceived public value, and website design) significantly affect users beliefs.as shown in the following figure
    - The empirical validation of the significant role of Attitude as a predictor of the citizen Behavioural intention to use e-government services. Prior research had omitted this construct from TAM, usually in workplace settings, where the use of the technology most of the time is mandatory. The contribution of this study was providing evidence for the significant role of this construct in voluntary settings such as e-government adoption.

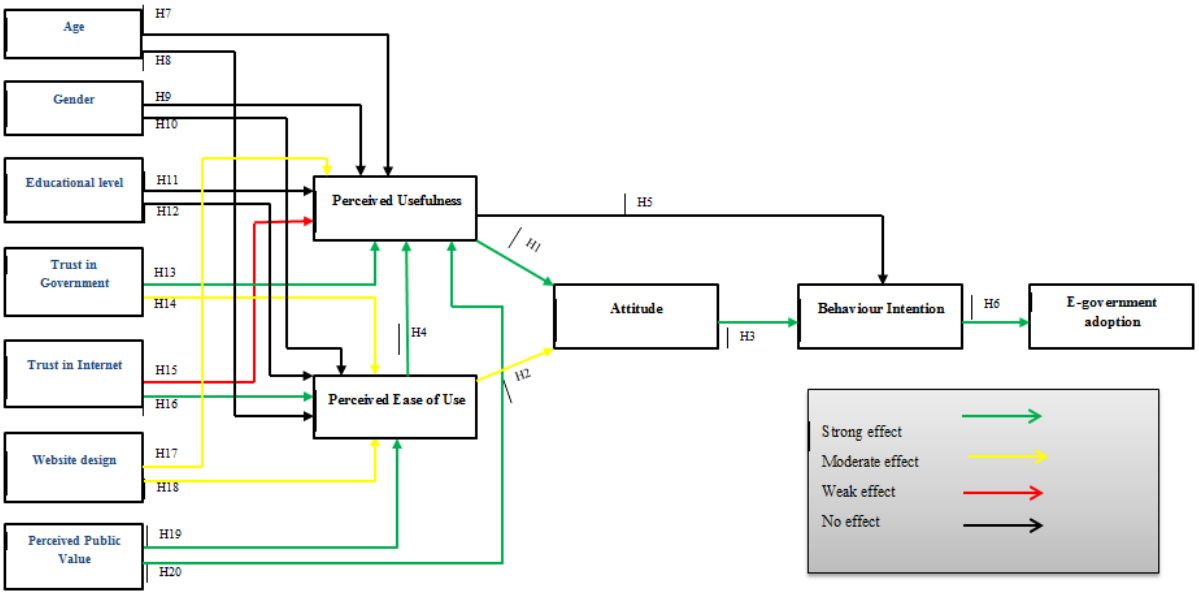


Figure 7.3: Final Model

2. An inventory of governmental, political and social factors, that impact the citizens' decision to adopt e-government services, provided for both practitioners and researchers. This could help them to better position their nation-wide strategies to encourage faster and more efficient adoption of these services. this is were done by creating 2 models to show the challenges that face Egyptian government from managerial and citizen perspectives as shown in the following figures.

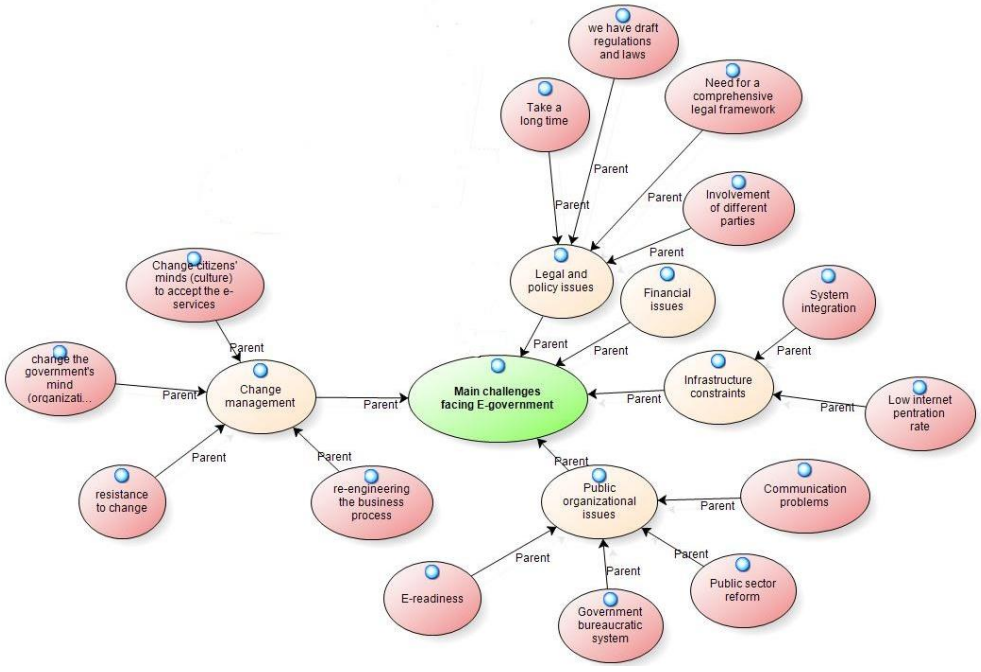


Figure 7.4: Final adoption model

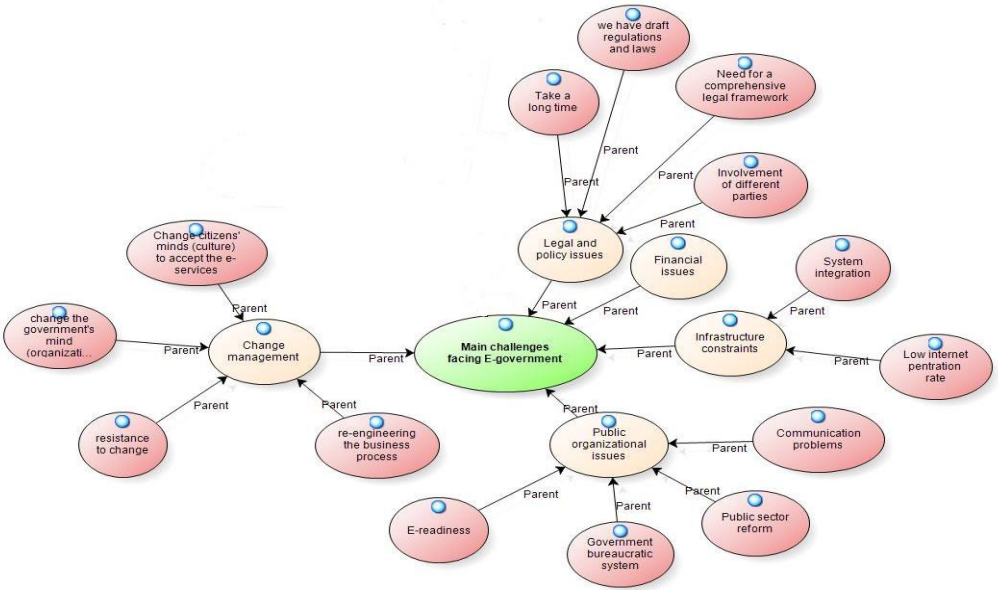


Figure7.5: Final Barrier model

7.4. Practical implications and beneficiaries

This research provides e-government officials and policy makers with a practical and communicable model of social, political, and technological factors, which are seamlessly integrated, and that cover the citizens' perspectives to better adoption of e-government services. This model should be considered as the cornerstone for any e-government project. Its contents came from the citizens' survey, which showed that "Trust in the Internet, Trust in Government, Website design, Perceived Public value, Perceived Usefulness, Perceived Ease of Use, and Attitude" contribute significantly to citizen adoption of e-government services in Egypt.

Also from the interviews with e-government senior managers in Egypt which added other important factors that can influence the adoption of e-government such as "digital divide, citizen awareness of the available e-government services, information security and privacy, service quality, and ICT literacy" and from interview with the citizens, the demographic variables "age, gender, education level" were added too. Furthermore, the research provides another model which contains the challenges that faced the

government in the implementation of e-government in Egypt from managerial and citizens point of view.

Since Egypt and other Arab countries are facing the problem of low level of citizen adoption of e-government services, the research outcomes will assist e-government officials and policy makers in Egypt (and any other country with similar characteristics), to better position their strategies to encourage faster and more efficient adoption of these services.

The outcomes of this study indicate that e-government agencies should enhance e-services based on users' requirements and knowledge, in order to make them easy to use for the wide-range of citizens in terms of Internet experience; also, organising free educational courses for those sectors of population with less knowledge about the Internet, and adapting e-services to different devices such as mobile phones.

In addition, given the dominant effect of perceived usefulness on Attitude, it is important for the government agencies to incorporate useful information and services into their websites. Public Administration should carry out campaigns to promote the benefits of e-government services in order to enhance the perception of a worthy service.

The government in Egypt can sustain the people's trust in different ways – by implementing information security and privacy policies on the government websites; providing reliable e-services; drafting and implementing related laws and regulations; transparency; and ensuring that citizens' queries will be adequately and quickly answered, which will positively increase the adoption of e-government.

The government in Egypt can ensure a citizen-centric design for its websites by standardizing website design, including updated links that do not lead to deleted pages

or re-directs, and consistent and attractive screen layouts. The government in Egypt should also increase promotional campaigns about the importance of utilising the Internet in daily life and introduce the Internet as a medium which can strongly identify with Egyptian cultural and social life, including Islamic values and traditions. Government agencies in Egypt should ensure that their websites are accessible to different users

Furthermore, government must concentrate on how to increase the value for the public from using e-government services in order to attract more people to use their online services; also e-government strategy must pay more attention to the requirements and expectations of users in developing e-government services. For example government must focus on the quality of the services offered and that can be measured by the availability of information, citizens' perceptions about the importance of the information, availability of multiple channels for citizens to access public services, cost and time savings, fairness of the services delivery, and citizens' satisfaction from e-government service delivery.

7.5. Recommendation for Egyptian government

To increase the adoption rate by citizens, the government need to:

- Not to underestimate the role of ease-of-use, it must be a priority when designing e-government services. It is therefore a responsibility of the government to elaborate e-services based on users' requirements and knowledge, in order to make them easy to use for the wide-range of citizens that exists in terms of Internet experience. Organise free formation courses for those sectors of population with less knowledge about the Internet and adapting e-services to different devices such as mobile phones might be also useful to increase the Perceived Ease of Use of these services.

- Carry out campaigns to promote the benefits of e-government services in order to enhance the perception of a worthy service (for example, in terms of time and cost saving, convenience, effectiveness, etc.). so the managers in charge of the online provision of public services should take into account that potential users have to perceive the usefulness of the service in order to adopt it.

- Strongly consider the characteristics of the online environment and employ a trusted quality system of service management combined with other techniques that could improve the perception of a trustworthy e-government service by citizens.

- Make government e-services trustworthy by implementing information security and privacy policies on the government websites; providing reliable e-services; drafting and implementing related laws and regulations; transparency; advertising campaigns to raise awareness of safety internet procedures applied; and ensuring that citizens‟ queries will be adequately and quickly answered, which will positively increase the adoption of e-government.

- Concentrate on how to increase the value for the public from using e-government services in order to attract more people to use their online services; also e-government strategy must pay more attention to the requirements and expectations of users in developing e-government services. For example government must focus on the quality of the services offered and that can be measured by the availability of information.

- Focus on campaigns to make them aware of the different values of the services, citizen's perceptions about the importance of the information, availability of

multiple channels for citizens to access public services, cost and time savings, fairness of the services delivery, and citizens‟ satisfaction on e-government service delivery.

- Ensure that their websites are accessible to different users. Improving citizens‟ accessibility to government services and information to increase government transparency is one of the main e-government objectives. The government in Egypt therefore should ensure that their websites are available with consistent and attractive screen layout, the links on the websites should be updated as they should not lead to deleted or re-directed pages. Ensuring that people are comfortable in interacting with the government via the web-based channel could enable the government to move and think about the other electronic based channels such as Mobile government services.

- Provide variety of electronic channels for launching government services to the citizens will assist the government to increase people's accessibility to the government information and services provided through the website and therefore have them more informational and technologically knowledgeable. The website should be accessible for people with disabilities e.g. hearing aids for the visually impaired and monochrome design options for colour blind, large button links for motor impairment, images for illiterate, explanations of terms etc.

- Take into account while designing the government portal that the percentage of illiteracy is very high, especially in the rural cities, and hence maybe add other communication means such as symbols or images or audio options.

- Try to change the citizen culture by providing some services for free for the first time usage to encourage citizens, definitely this means more e-government adoption.
- Create awareness among citizens and clarify the usefulness of these services. And to increase citizen's trust in e-government services by explaining to them that delivering online services will make things easier for them and they will be 100% secure.
- Provide reliable e-government services, response to citizen's enquiries quickly and accurately, and auditing of e-government portals and websites to ensure that all provided information is accurate and up to date.

To overcome the implementation barriers, the government need to:

- Increase the penetration rate of personal computers and Internet by supply personal computers to citizens at affordable prices, also provide internet to citizens at affordable price. And plan to train on using computers and the Internet for both government employees and citizens.

- Plan to provide alternative access channels such as mobiles, centres to the already web based channels, to deliver e-government services to the public in order to utilise the high penetration of such channels.

- Create awareness among citizens to convince them that using the internet as another source for obtaining services from the government will give more value such as saving time, saving money and accuracy by running advertising campaigns in order to change citizens‟ attitudes.

- Train government people to use the new technology, and to convince them with the idea that interacting with computers is more efficient than interacting directly with the citizens who are requesting the services, which will minimise the problems of face-to-face interaction. And for the employees who do not want to adapt with the new ways, government should find a replacement job for them.

- Provide the public with service-oriented and customer centric e-services by enhancing the public sector by cutting the red-tape, e-readiness, strong inter-agency coordination, and encouraging delegation methods to middle management.

- Prioritise e-government projects in their annual budget plan and also by finding sponsors in the private sectors through advertisement campaigns on its sites.

7.6. Scope of research

The areas of study outside the scope of this research are as follows:

1. This study adopted cross-sectional design. This cross sectional study represents a slice of time, and does not show how the citizen's attitude and behaviour may change over time. Further study employing a longitudinal design would ascertain whether or not the citizen's attitude toward using e-government services has changed over time.
2. This research surveyed people who are Internet literate. This highlights the necessity to conduct a study with illiterate citizens. A qualitative method of data collection, such as interviews or focus groups, may be more suitable for people who struggle with the literacy required to complete written surveys. This would help to include all Egyptian citizens in the study of e-government adoption and increase the generalizability of the results. Furthermore, this may be helpful in

generating useful comparisons between the different perceptions of e-government adoption of internet-literate and – illiterate people.

3. This research also focused on obtaining respondents' perceptions of government websites in general, rather than focusing on a specific website; thus, further studies could be conducted to examine e-government adoption by focusing on specific online service launched by particular government department in Egypt.
4. The last limitation is derived from the geographical location of the current research. Although, the study findings are believed to be applicable to other Arab countries that share the same demographic characteristics with Egypt and provide their citizens with the same level of e-government services, these findings are not necessarily applicable to other Arab countries that have lagged behind Egypt in terms of e-government. Therefore, further study in different countries would most likely strengthen and validate the findings on some of the hypotheses.
5. Due to political and security issues in Egypt the sample was chosen from student and post graduate students, and also internet café users. So it can be wider in future to include different organizations.

7.7. Model Future work

This study is only one episode in a chain of research studies. One possible direction for future research is to refine the attitude construct and improve its measurement by adopting a semantic differential scale and include items that capture the attitude strength dimension of this construct. Also, conduct a longitudinal study to see whether or not the variables and their relationships are consistent over time.

This research depend on both quantitative (survey), and qualitative (interview) methods in the data collection, the data were collected on e-government services as general,

concentrating on one or two services can be a future work and this can be done by using observation or experiments of participants using the e-government services for data collection.

Moreover, TAM needs major theoretical extensions in the future. One of the possible modifications on the original TAM could be to replace the perceived usefulness construct with the construct of perceived public value. This is because, in the context of e-government, the conceptualisation of perceived usefulness can be expanded from its current narrow focus on the performance to capture the strategic values that citizens can gain by using e-government services. Furthermore, one possible direction for future research is to test culture as an external variable to the existing model to see the effect of national cultural on the e-government adoption, also it was one of the factors derived from the qualitative analysis in this study.

Finally, the results reached in this study are believed to assist Egypt and other Arab countries with similar characteristics in e-government planning and citizen adoption. However, as mentioned previously, comparative studies will be valuable to match the findings of this study with other developing countries by conducting a similar study on different countries that share basic characteristics with Egypt. The findings reached might be compared to the results of this study, and extend its outcomes.

7.8. Concluding comments

This research has endeavoured to produce significant contributions to e-government adoption research and practice. The study integrates a combination of social, political, and technological factors to study how these factors affect current citizen adoption of e-government services in the Arab world, especially Egypt, and hence how to enhance it. Specifically, this study integrated the TAM model with other variables. It is believed that the research model developed in this study can serve as a foundation for future

research on citizen adoption of e-government services. The results of this study showed the importance of trust (internet and government), website design, public value, perceived usefulness, perceived ease of use, and attitude on citizen adoption of e-government services in Egypt. Interestingly, the findings also demonstrated that citizens' intention to use e-government services are most dominantly influenced by their attitude. This finding suggests that attitude construct deserves more attention in the voluntary settings due to its considerable influence on the usage intentions. In light of these findings, researchers and policy makers should consider the impact of these factors in order to rectify the existing low-level of citizen adoption of e-government services in the Arab world including Egypt.

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Appendix A: Questionnaire Survey

Determents of E-Government Adoption in Egypt

Thank you for showing an interest in this research project. Please read this information sheet carefully before deciding whether or not you wish to participate. Participation in this study is entirely voluntary.

Purpose: I am conducting a survey as part of the research for the degree of Doctor of Philosophy in Information Science at the University of Middlesex, London. My research aims to find out what are the factors that make Egyptian people likely to use the electronic government services through government websites to make their transactions online, Also what are the problems that prevent them from using the electronic government services within the public sector.

Description: All individuals are encouraged to participate in this survey, whether they have/ or have not been associated before with e-service activities. The survey will take about 20 minutes to complete. The survey will request your opinion about different aspects of Egypt's online government services. Also, it will ask some background information about you such as age, gender, education, Internet experience, and income. Your opinion and participation is extremely valuable.

Confidential: Participation in this study is entirely voluntary. You will not be identified in the questionnaire or my report, and so the answers you give will be confidential. If you feel uncomfortable answering any of the questions you do not need to answer them.

Finding out about the results: The survey results will be available to all participants. If you want to find out about the results of this survey, or you have any questions about the study please contact me through the email given below.

Email: s.elkheshin@gmail.com
Thank you for your cooperation.
Sara AbdelSalam ElKheshin
Teacher Associate
Arab Academy for Science and Technology

Section (1): ***Please tick (√) the most appropriate answer for the following items***

Background Information

1) **Gender:** a- Male b- Female

2) **What age group are you in?**
   a- 18- 29 b- 30-39 c- 40-50 d- 50-65

3) **What is your education level?**
   a- Secondary school b- College degree c- Postgraduate degree

4) **What is your current employment status?**
   a- Student b- Employed/ self employed
   c- Unemployed d- Pensioner e- Others *please specify*……..

5) **If you are working or a pensioner, what is your monthly income?**
   a- less than 500 EGP b- 500-2000 EGP c- 2001-4000 EGP d- more than 4000EGP

Internet Experience

6) **Have you ever used the Internet?**
   a- Yes b-No *(if No, please go to question 10)*

7) **How often do you use internet ?**
   a- Daily basis b- Weekly basis
   c- Monthly basis d- Only when needed

8) **Where do you use the Internet mainly? (***Choose more than one option if applicable)*
   a- Home b- Work
   c- university d- mobile phone/ipad e- Others *please specify* ……..

9) **What do you use the Internet mainly for? (***Choose more than one option if applicable)*
   a- Email b. Chatting and entertainment
   c. Information and knowledge search d. Others , *Please specify*…….

Public Service Information

10) **Will you be required to perform any transactions with any public organisation (e.g. obtaining a driver's license, a passport etc. or paying a bill of some sort) in the near future?**

a. Yes b. No

11) How many times annually do you conduct any transactions with the public sector?

a. Less than 5 times b. Between 5 and 10

c. Between 10 and 20 d. More than 20 times

12) How do you conduct the transactions with the public sector mainly? Choose more than one option if applicable

a. Face to face b. Using an agent

c. By phone d. Internet.

13) Please describe your experience(s) so far in conducting transactions with the public sector. What are the problems you've encountered (if any) or advantages?

……
……
……
……
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……
……

E-government Experience

"E-government is the use of information and technology to offer government information and services to citizens on the internet."

14) Have you ever visited or used any of e-government services available on any government websites? Ex: telecom Egypt service, national ID extract, Train reservation service

a. Yes b. No (*If No please go to question 18)*

15) Please indicate which one(s) have you tried?

……
……

16) How long have you been using these services?

a. Less than one year b. From 1-2 years c. More than 2 years

17) What do you think are the reasons for which you use government websites? (*please choose* all that apply)

a. Searching for information. b. Submitting online application form.

c. Downloading documents d. Making payment online.

e. Others (please indicate)……

18) What are the most important reasons for not using e-government services in your opinion?
(You can choose more than one).

	I do not know about the service/ information offered online		The government website does not have the information I want.
	I prefer the traditional way of providing the service (face to face contact)		The government website was too hard to use or understand.
	Using e-government services will cost me more money than using the traditional way		I have negative attitude towards using e-government services.
	I do not know how to use the e-services over the internet.		I believe I do not need them.
	I do not trust the internet to make financial transactions and payments with the government.		An online option for obtaining certain service (e.g. renewing driving license) was not available.
	I believe that the government will not keep my best interest in mind while offering the service.		The service that I want can only be done in person (e.g. obtaining ID card for first time).
	It is very difficult to navigate through e-government services websites.		I believe that there is no laws or regulations that protect my rights when dealing with government over the internet
	I tried to use e-government website, but the site does not work		

Section (2): ***Please √ to which you agree with the following statements***

		Strongly disagree	**Disagree**	**Neutral**	**Agree**	**Strongly agree**	**I don't know**
19	Using e-government website(s) enables me to accomplish my understanding of services and increase productivity.						
20	Using e-government website(s) will improve my performance in my transactions with the government.						
21	Using e-government website(s) can improve the service quality that I will receive compared to dealing with real people for the same service.						
22	Using e-government website(s) is useful for me						

		Strongly disagree	Disagree	Neutral	Agree	Strongly agree	I don't know
23	Learning how to operate e-government website(s) would be easy for me						
24	I would find it easy to get the e-government to do what I want it to do.						
25	It would be easy for me to become skilful at using the e-government services on the internet.						
26	I would find the e-government easy to use.						

		Strongly disagree	Disagree	Neutral	Agree	Strongly agree	I don't know
27	I like the use of e-government website to access government service(s).						
28	Using the e-government websites to access e-government service(s) is a good idea						
29	Using the e-government websites to access e-government service(s) would be a pleasant experience.						

		Strongly disagree	Disagree	Neutral	Agree	Strongly agree	I don't know
30	I intend to use e-government services in the next two years to come.						
31	I intend to use e-government on regular basis in the future.						
32	I intend to use e-government in my next application of renewing my national id.						
33	I will strongly recommend others to use e-government services.						

		Strongly disagree	Disagree	Neutral	Agree	Strongly agree	I don't know
34	E-government website(s) are available with well organised structure and easy links.						
35	E-government website(s) are visually appealing						
36	E-government website(s) provide up to date information						
37	E-government website(s) present information in a simple and understandable manner						
38	E-government website(s) contain links to other websites that citizens may be interested in.						

39	E-government website(s) tell me what to do if the service cannot be offered.						

		Strongly disagree	**Disagree**	**Neutral**	**Agree**	**Strongly agree**	**I don't know**
40	Using e-government website(s) is an efficient way to manage my time						
41	Using e-government website(s) provides better value for money						
42	Using e-government website(s) increases the government transparency						
43	Overall, I believe that using e-government website(s) to access government services provides good public value						

		Strongly disagree	**Disagree**	**Neutral**	**Agree**	**Strongly agree**	**I don't know**
44	E-government website(s) have enough safeguards (e.g. Security policy to make me feel comfortable using them to access government services)						
45	In general, the internet is now a robust and safe environment in which to transact with the government						
46	I am confident that the data I submit through the government websites will not be misused and will be treated confidentially						
47	The government can be trusted to carry out online transactions faithfully.						
48	I trust the government because they keep my best interest in mind						
49	I am confident that the forms I submit through the government websites will be processed and not ignored						
50	In my opinion, e-government website(s) and government are trustworthy						

Appendix B

Upper critical values of chi-square distribution with degrees of freedom

Probability of exceeding the critical value

ν	0.10	0.05	0.025	0.01	0.001
1	2.706	3.841	5.024	6.635	10.828
2	4.605	5.991	7.378	9.210	13.816
3	6.251	7.815	9.348	11.345	16.266
4	7.779	9.488	11.143	13.277	18.467
5	9.236	11.070	12.833	15.086	20.515
6	10.645	12.592	14.449	16.812	22.458
7	12.017	14.067	16.013	18.475	24.322
8	13.362	15.507	17.535	20.090	26.125
9	14.684	16.919	19.023	21.666	27.877
10	15.987	18.307	20.483	23.209	29.588
11	17.275	19.675	21.920	24.725	31.264
12	18.549	21.026	23.337	26.217	32.910
13	19.812	22.362	24.736	27.688	34.528
14	21.064	23.685	26.119	29.141	36.123
15	22.307	24.996	27.488	30.578	37.697
16	23.542	26.296	28.845	32.000	39.252
17	24.769	27.587	30.191	33.409	40.790
18	25.989	28.869	31.526	34.805	42.312
19	27.204	30.144	32.852	36.191	43.820
20	28.412	31.410	34.170	37.566	45.315
21	29.615	32.671	35.479	38.932	46.797
22	30.813	33.924	36.781	40.289	48.268
23	32.007	35.172	38.076	41.638	49.728
24	33.196	36.415	39.364	42.980	51.179
25	34.382	37.652	40.646	44.314	52.620
26	35.563	38.885	41.923	45.642	54.052
27	36.741	40.113	43.195	46.963	55.476
28	37.916	41.337	44.461	48.278	56.892
29	39.087	42.557	45.722	49.588	58.301
30	40.256	43.773	46.979	50.892	59.703
31	41.422	44.985	48.232	52.191	61.098
32	42.585	46.194	49.480	53.486	62.487
33	43.745	47.400	50.725	54.776	63.870

Appendix C

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16 March 2014

To whom it may concern

Ethical approval for research undertaken by Sara Elkheshin

This is to confirm that the Sara Elkheshin applied to the Department of Computer Science Ethics Committee for ethics approval regarding a questionnaire survey to be undertaken as part of her Ph.D. research. The committee gave feedback on parts of the questionnaire which were provided to the applicant and which have been addressed in the revised questionnaire, therefore ethics approval has been granted.

Dr. Carlisle George

Chair, Department of Computer Science Ethics Committee

Appendix D

Consent Form for Interview Participants

CERTIFICATION BY PARTICIPANT

I**,**

From,

Certify that I am at least 18 years old and that I am voluntarily giving my consent to provide information for the above described work entitled **Investigating the , the factors that influence E-government adoption by citizens and E-government implementation by the government implementation in Egypt over time,** being conducted at Middlesex University, London, UK by Mrs. Sara ELKheshin

I certify that the objectives of the interviews, together with any risks to me associated with the procedures listed hereunder, have been fully explained to me and that I freely consent to participate in this work.

Procedures:

Semi-structured interview conducted by Mrs. Sara ELKheshin. The interview will be taped or notes taken according to the participant's preference in order to record information accurately. The information gathered will be kept confidential along with the identity of the participant.

I understand that I can withdraw from this work at any time and that this withdrawal will not put me at risk in any way.

I have been informed that the information I provide will be kept confidential.

Signed: **….....**

Dated**: ….....**

Appendix E

List of Questions with the government

1. What is your job please?
2. Can you please tell me what do you think the advantages, if any, of the E-government programme?
3. Can you please tell me what are the barriers facing you in the Implementation of e-government? Why?
4. What are the problems of the E-government you are facing?
5. What are the challenges facing the IT infrastructure in the public sector?
6. Have you established a powerful network that can facilitate e-government connectivity?
7. How are you dealing with the unmanaged data and limited information available in the public sector?
8. In your viewpoint, Why do you think Egypt is interested in e-government?
9. Is there any resistance against the programme?
10. How did you find the reaction of government organization with this change?
11. How will you promote for the program?
12. What process has been used up to the present to implement e-government in Egypt? Has this changed over time, and if so, why?
13. Have any new investments taken place in Egypt as a result of commencing the e-government implementation?
14. Are there any plans in your Parliament's agenda to change the laws and regulations so as to be aligned with e-services?
15. Is politics influencing the e-government initiatives in any way? And are politicians supportive enough to play a significant role in the adoption process?
16. How strong is the investment in ICT? And is it helping in the e-government adoption process?
17. Are you adopting specific policies in order to help in the adoption process?
18. In your view point, what are the factors that affect the adoption of government e-services by the citizens?

Appendix F

Citizen Interview questions

1- What do you think e-government is?

2- Have you used e-government services in Egypt? If no ask question 3 if yes ask skip 3

3- In your opinion, what do you want the Egyptian government to do to convince you to engage with its e-government system?

4- When you first used e-government, what was your motivation to participate in general?

5- Please explain why and how if your decision to use e-government services affected by any factor related to:

- Yourself (gender- ages- culture-values education level…etc.).
- The system (the website itself being easy, difficult…. etc.).
- The transaction (being secured, similar the way you always do ….etc.).

6- Think about the followings scenarios, which one is risky to the extent that makes you I am not going to use this service again

- You did an online application then your personal data was theft
- You did an online application then it got lost
- You did an online application, submitted all requirement though, it took more than usual processing time

7- If a service is available both online and offline and use of Egyptian e-government website is too difficult to use would you still use online facility? Id yes, then why (example of possible difficulty: very time consuming, low internet speed, strange terms or language).

8- Please think back to your first time to use e-government services, then explain to me if you done it because you felt that it would be a pleasant experience to try something new to you?

9- When you use e-government services, did you ever stop and ask yourself whether you trust this online program or this government agent and why?

10- In your opinion, can you explain to me which of the following barriers are affecting the adoption of e-government services by the Egyptian people and why

- Lack of users' IT knowledge, awareness and motivation
- Lack of skilled IT staff, Internet and computer costs
- Lack of users' trust and confidence, lack of security
- Culture and language conflict, Poor infrastructure and technologies
- Bad project control and management
- Lack of users inputs and feedbacks, Lack of Funding
- Lack of proper legislation and laws, Lack of marketing campaigns